Light is OSRAM

OSRAM
Opto Semiconductors

DURIS® S 8
White (CCT 2200 K – 6500 K)

ANSI/IES LM-80-15 Test Report

Test Documentation No.:
190366W5 (Document no. OSRM050-A3-180) – 22nd July 2020

CSA GROUP™

NVLAP®
TESTING
NVLAP LAB CODE 500055 0

LM80 13000 Hour Interval Test Report

IES LM-80-15 Approved Method for Measuring Lumen Maintenance of LED Light Sources

CSA Group Report: OSRM050-A3-180

July 16, 2020

Manufacturer:	**OSRAM**
Models tested:	**GWP9LR34.PM**
	DURIS S8
Test conditions:	24 devices @ 55.0 C, 0.200 A 18 devices @ 85.0 C, 0.200 A 18 devices @ 105.0 C, 0.200 A

Prepared for:
OSRAM Opto Semiconductors (Malaysia) Sdn.
Bayan Lepas Free Industrial Zone Phase 1,
11900 Bayan Lepas, Penang, Malaysia

Attn:

Testing performed by:
CSA Group Seattle
14833 NE 87th St
Redmond, WA 98052
425-605-8500
www.csagroupseattle.org

Test report prepared by:

Gabriel Trippel

Project Engineer,
Test and Measurement Services

Test report approved by:

KC Fletcher

Project Manager,
Test and Measurement Services

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425-605-8500
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1.0 Statement of test conditons, summary of results, and reporting requirements:

Part number: GWP9LR34.PM					
Life test conditions				Summary of results	
Test condition	Drive current (A)	Case temperature (°C)	Elapsed life test time (hrs)	Average lumen maintenance (%)	Average chromaticity shift (Δu'v')
TC1	0.200	55	13000	99.3	0.0002
TC2	0.200	85	13000	97.5	0.0014
TC3	0.200	105	13000	92.1	0.0039

LM80-15 Reporting requirements	
1. Number of samples tested:	24 samples @ 55°C,18 samples @ 85°C,18 samples @ 105°C
2. Description of LED light sources	LED Package[1]
3. Description of auxiliary equipment	see section 6.1 below
4. Operating cycle	LED packages are driven at constant current for life test and are pulsed for photometric test.
5. Ambient conditions, airflow, relative humidity	LED's are operated on controlled thermal plates in an environment that complies with the requirements given in Section 4.4 of LM80-15. Case temperature (Ts): controlled to within -2°C, Surrounding air temp: controlled to within -5°C of Ts, Humidity: < 65 RH, No forced air flow
6. Case temperature (test point temperature)	See summary table above for test conditions. The temperature measurment point is shown in Sec. 6.3.
7. Drive current during life test	see summary table above
8. Initial luminous flux and forward voltage	see data tables for individual test conditions
9. Lumen maintenance data for each individual LED light source	see data tables for individual test conditions
10. Observation of LED light source failures	see data tables for individual test conditions
11. LED light source monitoring intervals	see data tables for individual test conditions
12. Photometric measurement uncertainty	k=2 expanded measurement uncertainty for relative luminous flux measurements is ±2.0%
13. Chromaticity shift reported over the measurement time	see data tables for individual test conditons
14. Test start date	December 6, 2018
15. ANSI target and calculated CCT values	see data tables

Notes:

1. per ANSI/IESNA RP-16-05 Addendum b, *Nomenclature and Definitions for Illuminating Engineering*

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TABLE 1.1 - Initial ANSI Target & Calculated CCT Results GWP9LR34.PM

Load board ID	Device number	Zero hour measurements	
		ANSI Target* CCT (K)	Initial Calculated CCT (K)
1100001157OD031C	D1	2725±145	2749
	D2	2725±145	2781
	D3	2725±145	2768
	D4	2725±145	2767
	D5	2725±145	2772
	D6	2725±145	2760
230000115BB2031C	D1	2725±145	2757
	D2	2725±145	2769
	D3	2725±145	2754
	D4	2725±145	2782
	D5	2725±145	2761
	D6	2725±145	2760
6800001161840 31C	D1	2725±145	2784
	D2	2725±145	2759
	D3	2725±145	2751
	D4	2725±145	2770
	D5	2725±145	2758
	D6	2725±145	2764
8D0000115420031C	D1	2725±145	2766
	D2	2725±145	2748
	D3	2725±145	2753
	D4	2725±145	2749
	D5	2725±145	2749
	D6	2725±145	2749

Load board ID	Device number	Zero hour measurements	
		ANSI Target* CCT (K)	Initial Calculated CCT (K)
4000001150 45031C	D1	2725±145	2757
	D2	2725±145	2772
	D3	2725±145	2760
	D4	2725±145	2754
	D5	2725±145	2740
	D6	2725±145	2760
4C0000116814031C	D1	2725±145	2770
	D2	2725±145	2770
	D3	2725±145	2761
	D4	2725±145	2765
	D5	2725±145	2765
	D6	2725±145	2774
AC00001144A5031C	D1	2725±145	2759
	D2	2725±145	2769
	D3	2725±145	2754
	D4	2725±145	2748
	D5	2725±145	2776
	D6	2725±145	2759

Load board ID	Device number	Zero hour measurements	
		ANSI Target* CCT (K)	Initial Calculated CCT (K)
0500001166B5031C	D1	2725±145	2774
	D2	2725±145	2764
	D3	2725±145	2761
	D4	2725±145	2757
	D5	2725±145	2767
	D6	2725±145	2764
2D00001165CA031C	D1	2725±145	2758
	D2	2725±145	2766
	D3	2725±145	2775
	D4	2725±145	2768
	D5	2725±145	2773
	D6	2725±145	2770
BF0000115601031C	D1	2725±145	2757
	D2	2725±145	2764
	D3	2725±145	2769
	D4	2725±145	2774
	D5	2725±145	2772
	D6	2725±145	2758

* target CCT as defined in ANSI C78.377-2008

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Test Condition 1 55 °C 0.200 A

TABLE 2.0 - LUMEN MAINTENANCE RESULTS **GWP9LR34.PM**

Test Condition 1 55 °C 0.200 A

Photometric test drive current: 0.200 A
Photometric test ambient temperature: 25 ± 2 °C
Failures observed: none

Load board ID	Device number	Zero hour measurements Flux (lm)	Vf (V)	Lumen Maintenance (%) 3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000
110000115700031C	D1	709.07	24.70	100.5	100.7	100.7	100.5	100.3	100.1	100.1	100.0	99.9	99.4	99.1
	D2	716.14	24.70	100.8	100.9	100.9	100.8	100.7	100.6	100.5	100.4	100.4	100.1	99.8
	D3	712.35	24.74	100.1	100.4	100.5	100.4	100.2	100.1	100.0	99.9	99.9	99.5	99.2
	D4	705.69	24.68	100.7	100.7	100.7	100.5	100.3	100.1	100.1	99.9	99.8	99.5	99.0
	D5	719.90	24.68	100.6	100.7	100.8	100.7	100.5	100.3	100.2	100.1	100.1	99.8	99.5
	D6	709.26	24.68	101.0	101.0	101.1	101.0	100.9	100.7	100.7	100.5	100.4	100.1	99.7
230000115BB2031C	D1	708.41	24.62	100.8	100.8	101.0	100.8	100.7	100.6	100.5	100.4	100.3	100.1	99.6
	D2	701.64	24.71	100.7	100.7	100.6	100.5	100.4	100.2	100.1	100.0	99.9	99.6	99.1
	D3	701.75	24.76	100.6	100.6	100.6	100.5	100.3	100.2	100.0	99.8	99.8	99.4	98.9
	D4	712.10	24.62	101.0	101.1	101.2	101.1	101.0	100.8	100.7	100.6	100.6	100.3	99.9
	D5	697.43	24.74	100.7	100.7	100.6	100.4	100.3	100.1	99.9	99.9	99.8	99.5	99.0
	D6	723.06	24.91	100.8	100.9	100.9	100.7	100.7	100.5	100.4	100.3	100.1	99.8	99.3
680000116184031C	D1	702.72	24.81	100.6	100.5	100.6	100.5	100.5	100.3	100.1	100.0	100.0	99.7	99.4
	D2	707.06	24.73	100.7	100.7	100.8	100.6	100.6	100.4	100.3	100.3	100.2	99.9	99.5
	D3	715.45	24.65	100.5	100.5	100.5	100.3	100.3	100.1	100.0	99.9	99.7	99.4	99.0
	D4	710.94	24.64	100.7	100.7	100.8	100.5	100.6	100.4	100.2	100.1	100.1	99.7	99.3
	D5	722.68	24.84	100.6	100.5	100.6	100.3	100.3	100.0	99.9	99.8	99.7	99.4	98.9
	D6	714.05	24.76	100.6	100.7	100.7	100.6	100.6	100.2	100.1	100.0	99.9	99.6	99.2
8D0000115420031C	D1	693.49	24.70	100.7	100.8	100.9	100.7	100.5	100.3	100.1	100.0	99.8	99.5	99.0
	D2	716.33	24.71	100.8	100.9	101.0	100.9	100.8	100.5	100.4	100.3	100.2	99.9	99.6
	D3	711.30	24.63	100.6	100.7	100.7	100.6	100.5	100.4	100.3	100.2	100.0	99.9	99.5
	D4	714.52	24.81	100.2	100.3	100.3	100.2	100.0	100.0	99.9	99.7	99.5	99.3	99.0
	D5	698.13	24.72	100.7	100.8	100.8	100.6	100.4	100.3	100.2	100.0	99.9	99.7	99.1
	D6	711.91	24.64	100.5	100.7	100.7	100.6	100.5	100.2	100.1	100.0	99.9	99.7	99.3
		n		24	24	24	24	24	24	24	24	24	24	24
		mean		100.6	100.7	100.7	100.6	100.5	100.3	100.2	100.1	100.0	99.7	99.3
		median		100.7	100.7	100.7	100.6	100.5	100.3	100.1	100.0	99.9	99.7	99.2
		std. dev.		0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
		min		100.1	100.3	100.3	100.2	100.0	100.0	99.9	99.7	99.5	99.3	98.9
		max		101.0	101.1	101.2	101.1	101.0	100.8	100.7	100.6	100.6	100.3	99.9

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Test Condition 1 55 °C 0.200 A

TABLE 2.1 - CHROMATICITY SHIFT RESULTS **GWP9LR34.PM**
Test Condition 1 55 °C 0.200 A

Photometric test drive current: 0.200 A
Photometric test ambient temperature: 25 ± 2 °C
Failures observed: none

Load board ID	Device number	Zero hour measurements u'	Zero hour measurements v'		Chromaticity shift (Δu'v') 3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000
110000115700031C	D1	0.2605	0.5257		0.0002	0.0003	0.0003	0.0003	0.0002	0.0002	0.0003	0.0002	0.0002	0.0002	0.0002
	D2	0.2589	0.5262		0.0002	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.0002	0.0003	0.0003	0.0002
	D3	0.2594	0.5268		0.0003	0.0003	0.0004	0.0004	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.0003
	D4	0.2595	0.5266		0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
	D5	0.2592	0.5267		0.0003	0.0003	0.0004	0.0004	0.0003	0.0003	0.0004	0.0004	0.0004	0.0004	0.0003
	D6	0.2600	0.5255		0.0003	0.0004	0.0004	0.0004	0.0004	0.0003	0.0004	0.0003	0.0003	0.0002	0.0002
230000115BB2031C	D1	0.2601	0.5259		0.0004	0.0004	0.0004	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003	0.0004
	D2	0.2595	0.5262		0.0003	0.0003	0.0003	0.0004	0.0003	0.0004	0.0004	0.0003	0.0003	0.0003	0.0002
	D3	0.2603	0.5258		0.0003	0.0003	0.0004	0.0004	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.0002
	D4	0.2589	0.5259		0.0002	0.0002	0.0003	0.0003	0.0003	0.0002	0.0003	0.0002	0.0002	0.0002	0.0001
	D5	0.2603	0.5241		0.0003	0.0004	0.0004	0.0005	0.0004	0.0004	0.0004	0.0003	0.0004	0.0004	0.0003
	D6	0.2599	0.5260		0.0003	0.0003	0.0004	0.0004	0.0003	0.0004	0.0005	0.0003	0.0003	0.0003	0.0003
68000011618403IC	D1	0.2589	0.5254		0.0002	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
	D2	0.2599	0.5263		0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
	D3	0.2603	0.5262		0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.0002
	D4	0.2595	0.5258		0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0002	0.0002	0.0001
	D5	0.2600	0.5263		0.0002	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003
	D6	0.2597	0.5262		0.0003	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
8D0000115420031C	D1	0.2597	0.5257		0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003	0.0003
	D2	0.2603	0.5269		0.0003	0.0004	0.0004	0.0004	0.0003	0.0004	0.0004	0.0003	0.0004	0.0004	0.0003
	D3	0.2598	0.5280		0.0003	0.0004	0.0003	0.0004	0.0003	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003
	D4	0.2605	0.5258		0.0003	0.0004	0.0004	0.0004	0.0003	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003
	D5	0.2606	0.5250		0.0003	0.0003	0.0004	0.0004	0.0003	0.0003	0.0004	0.0003	0.0004	0.0003	0.0003
	D6	0.2604	0.5261		0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002	0.0003	0.0002	0.0002
			n		24	24	24	24	24	24	24	24	24	24	24
			mean		0.0003	0.0003	0.0003	0.0004	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.0002
			median		0.0003	0.0003	0.0003	0.0004	0.0003	0.0003	0.0004	0.0003	0.0003	0.0003	0.0002
			std. dev.		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0000	0.0001	0.0001
			min		0.0002	0.0002	0.0003	0.0003	0.0002	0.0002	0.0003	0.0002	0.0002	0.0002	0.0001
			max		0.0004	0.0004	0.0004	0.0005	0.0004	0.0004	0.0005	0.0004	0.0004	0.0004	0.0004

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Test Condition 1 55 °C 0.200 A

TABLE 2.2 - FORWARD VOLTAGE MAINTENANCE RESULTS **GWP9LR34.PM**

Test Condition 1 55 °C 0.200 A

Photometric test drive current: 0.200 A
Photometric test ambient temperature: 25 ± 2 °C
Failures observed: none

Load board ID	Device number	Zero hour measurements Vf (V)		Forward Voltage Maintainence (%) 3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000
110000115700031C	D1		24.70	100.18	100.17	100.23	100.27	100.31	100.27	100.35	100.38	100.38	100.40	100.42
	D2		24.70	100.17	100.17	100.19	100.19	100.22	100.26	100.27	100.33	100.32	100.34	100.37
	D3		24.74	100.16	100.16	100.20	100.22	100.26	100.28	100.31	100.30	100.36	100.37	100.38
	D4		24.68	100.11	100.15	100.16	100.20	100.24	100.22	100.24	100.25	100.30	100.33	100.34
	D5		24.68	100.02	100.10	100.12	100.12	100.13	100.18	100.19	100.20	100.21	100.21	100.26
	D6		24.68	100.06	100.13	100.14	100.17	100.17	100.20	100.23	100.24	100.24	100.25	100.28
230000115BB2031C	D1		24.62	100.04	100.07	100.10	100.08	100.13	100.13	100.19	100.18	100.17	100.21	100.24
	D2		24.71	100.12	100.09	100.16	100.20	100.23	100.25	100.26	100.28	100.33	100.33	100.35
	D3		24.76	100.13	100.18	100.19	100.23	100.26	100.28	100.34	100.35	100.37	100.40	100.39
	D4		24.62	100.08	100.10	100.11	100.13	100.18	100.19	100.19	100.18	100.22	100.25	100.25
	D5		24.74	100.12	100.15	100.21	100.23	100.26	100.27	100.32	100.31	100.34	100.32	100.39
	D6		24.91	100.04	100.08	100.10	100.12	100.16	100.17	100.20	100.22	100.23	100.22	100.24
680000116184031C	D1		24.81	100.30	100.38	100.37	100.42	100.43	100.46	100.49	100.53	100.58	100.62	100.62
	D2		24.73	100.10	100.12	100.17	100.20	100.21	100.19	100.27	100.29	100.26	100.33	100.32
	D3		24.65	100.13	100.21	100.25	100.25	100.26	100.30	100.31	100.35	100.34	100.41	100.39
	D4		24.64	100.16	100.20	100.22	100.29	100.25	100.29	100.31	100.31	100.36	100.39	100.41
	D5		24.84	100.14	100.18	100.23	100.26	100.25	100.31	100.36	100.35	100.38	100.40	100.41
	D6		24.76	100.18	100.22	100.23	100.29	100.31	100.31	100.33	100.38	100.38	100.40	100.46
8D0000115420031C	D1		24.70	99.99	100.02	100.03	100.05	100.07	100.06	100.09	100.15	100.11	100.15	100.16
	D2		24.71	100.03	100.06	100.08	100.11	100.11	100.11	100.12	100.15	100.15	100.14	100.22
	D3		24.63	100.12	100.17	100.20	100.23	100.24	100.27	100.28	100.27	100.29	100.36	100.39
	D4		24.81	100.16	100.25	100.29	100.30	100.30	100.35	100.38	100.41	100.44	100.43	100.48
	D5		24.72	100.11	100.17	100.18	100.22	100.21	100.25	100.29	100.31	100.30	100.34	100.37
	D6		24.64	100.14	100.12	100.16	100.17	100.17	100.22	100.26	100.26	100.29	100.31	100.32
			n	24	24	24	24	24	24	24	24	24	24	24
			mean	100.1	100.2	100.2	100.2	100.2	100.2	100.3	100.3	100.3	100.3	100.4
			median	100.1	100.2	100.2	100.2	100.2	100.3	100.3	100.3	100.3	100.3	100.4
			std. dev.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
			min	100.0	100.0	100.0	100.0	100.1	100.1	100.1	100.1	100.1	100.1	100.2
			max	100.3	100.4	100.4	100.4	100.4	100.5	100.5	100.5	100.6	100.6	100.6

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Test Condition 2 85 °C 0.200 A

TABLE 3.0 - LUMEN MAINTENANCE RESULTS **GWP9LR34.PM**

Test Condition 2 85 °C 0.200 A

Photometric test drive current: 0.200 A
Photometric test ambient temperature: 25 ± 2 °C
Failures observed: none

Load board ID	Device number	Zero hour measurements Flux (lm)	Vf (V)	Lumen Maintenance (%) 3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000
4000001150450 31C	D1	713.56	24.61	100.3	100.1	100.0	99.5	99.2	99.1	98.7	98.4	98.3	98.0	97.6
	D2	711.36	24.79	100.4	100.2	100.0	99.5	99.2	99.2	98.6	98.1	98.0	97.8	97.4
	D3	706.85	24.72	100.3	100.1	100.0	99.4	99.2	99.1	98.6	98.3	98.1	97.8	97.3
	D4	708.97	24.74	100.4	100.3	100.2	99.7	99.4	99.2	98.8	98.5	98.3	98.0	97.4
	D5	712.37	24.67	100.3	100.3	100.3	99.9	99.6	99.5	99.2	99.0	98.8	98.7	98.2
	D6	708.54	24.89	100.3	100.2	100.1	99.7	99.5	99.4	99.0	98.7	98.4	98.1	97.7
4C00001168140 31C	D1	695.71	24.72	100.2	100.2	100.1	99.6	99.2	99.1	98.5	98.2	97.9	97.5	97.0
	D2	711.10	24.57	100.4	100.3	100.2	99.8	99.4	99.3	98.8	98.6	98.3	98.0	97.6
	D3	717.12	24.67	100.2	100.0	99.8	99.3	99.0	98.8	98.3	98.0	97.8	97.3	96.8
	D4	718.77	24.71	100.5	100.3	100.2	99.8	99.3	99.2	98.8	98.4	98.2	97.9	97.3
	D5	712.88	24.66	100.5	100.3	100.0	99.5	99.1	98.9	98.4	98.0	97.8	97.6	97.0
	D6	707.21	24.69	100.2	100.0	99.9	99.4	99.0	98.9	98.3	98.1	97.8	97.4	96.8
AC00001144A5031C	D1	719.31	24.66	100.6	100.5	100.4	100.0	99.7	99.6	99.3	99.0	98.9	98.6	98.3
	D2	720.69	24.71	100.2	100.1	99.9	99.4	99.1	98.9	98.6	98.2	98.1	97.8	97.5
	D3	719.55	24.67	100.2	100.0	99.7	99.2	99.0	98.8	98.4	98.0	98.0	97.7	97.2
	D4	707.40	24.72	100.1	100.0	99.9	99.5	99.2	99.1	98.7	98.4	98.3	97.9	97.5
	D5	721.60	24.59	100.5	100.2	100.0	99.6	99.3	99.0	98.6	98.4	98.2	97.9	97.6
	D6	730.28	24.65	100.3	100.2	100.1	99.8	99.6	99.6	99.3	99.0	99.0	98.7	98.4
n				18	18	18	18	18	18	18	18	18	18	18
mean				100.3	100.2	100.0	99.6	99.3	99.1	98.7	98.4	98.2	97.9	97.5
median				100.3	100.2	100.0	99.6	99.2	99.1	98.7	98.4	98.2	97.9	97.4
std. dev.				0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5
min				100.1	100.0	99.7	99.2	99.0	98.8	98.3	98.0	97.8	97.3	96.8
max				100.6	100.5	100.4	100.0	99.7	99.6	99.3	99.0	99.0	98.7	98.4

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Test Condition 2 85 °C 0.200 A

TABLE 3.1 - CHROMATICITY SHIFT RESULTS GWP9LR34.PM

Test Condition 2 85 °C 0.200 A

Photometric test drive current: 0.200 A
Photometric test ambient temperature: 25 ± 2 °C
Failures observed: none

Load board ID	Device number	Zero hour measurements u'	v'		Chromaticity shift (Δu'v') 3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000
4000001150450 31C	D1	0.2600	0.5261		0.0005	0.0006	0.0007	0.0009	0.0010	0.0010	0.0012	0.0012	0.0014	0.0014	0.0015
	D2	0.2592	0.5267		0.0005	0.0006	0.0007	0.0009	0.0009	0.0011	0.0011	0.0013	0.0014	0.0015	0.0016
	D3	0.2599	0.5261		0.0005	0.0006	0.0006	0.0008	0.0008	0.0009	0.0010	0.0011	0.0011	0.0012	0.0012
	D4	0.2604	0.5251		0.0004	0.0005	0.0006	0.0008	0.0008	0.0009	0.0011	0.0011	0.0012	0.0013	0.0014
	D5	0.2607	0.5267		0.0005	0.0005	0.0006	0.0007	0.0008	0.0009	0.0009	0.0010	0.0011	0.0011	0.0012
	D6	0.2601	0.5252		0.0004	0.0005	0.0005	0.0007	0.0007	0.0009	0.0010	0.0010	0.0012	0.0012	0.0012
4C00001168140 31C	D1	0.2597	0.5246		0.0004	0.0004	0.0005	0.0007	0.0008	0.0009	0.0010	0.0011	0.0012	0.0012	0.0014
	D2	0.2595	0.5259		0.0004	0.0005	0.0006	0.0007	0.0008	0.0009	0.0011	0.0011	0.0012	0.0012	0.0013
	D3	0.2598	0.5264		0.0005	0.0005	0.0006	0.0008	0.0009	0.0010	0.0012	0.0012	0.0013	0.0014	0.0015
	D4	0.2595	0.5269		0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0012	0.0013	0.0013	0.0014	0.0016
	D5	0.2594	0.5273		0.0005	0.0006	0.0007	0.0009	0.0010	0.0012	0.0014	0.0015	0.0016	0.0016	0.0018
	D6	0.2592	0.5262		0.0005	0.0005	0.0007	0.0008	0.0009	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
AC00001144A5 31C	D1	0.2597	0.5272		0.0004	0.0004	0.0005	0.0006	0.0007	0.0008	0.0010	0.0010	0.0011	0.0012	0.0013
	D2	0.2595	0.5260		0.0004	0.0005	0.0007	0.0009	0.0009	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
	D3	0.2599	0.5274		0.0005	0.0006	0.0007	0.0009	0.0010	0.0011	0.0012	0.0013	0.0014	0.0015	0.0016
	D4	0.2607	0.5250		0.0004	0.0005	0.0005	0.0007	0.0008	0.0008	0.0009	0.0010	0.0010	0.0011	0.0011
	D5	0.2591	0.5264		0.0004	0.0005	0.0006	0.0007	0.0009	0.0010	0.0012	0.0012	0.0013	0.0015	0.0016
	D6	0.2596	0.5277		0.0004	0.0004	0.0006	0.0006	0.0006	0.0007	0.0008	0.0008	0.0008	0.0009	0.0009
n					18	18	18	18	18	18	18	18	18	18	18
mean					0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0011	0.0012	0.0012	0.0013	0.0014
median					0.0004	0.0005	0.0006	0.0008	0.0008	0.0010	0.0011	0.0012	0.0013	0.0013	0.0014
std. dev.					0.0000	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0002	0.0002	0.0002	0.0002
min					0.0004	0.0004	0.0005	0.0006	0.0006	0.0007	0.0008	0.0008	0.0008	0.0009	0.0009
max					0.0005	0.0006	0.0007	0.0009	0.0010	0.0012	0.0014	0.0015	0.0016	0.0016	0.0018

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AE (Elec.)

Test Condition 2 85 °C 0.200 A

TABLE 3.2 - FORWARD VOLTAGE MAINTENANCE RESULTS GWP9LR34.PM

Test Condition 2 85 °C 0.200 A

Photometric test drive current: 0.200 A
Photometric test ambient temperature: 25 ± 2 °C
Failures observed: none

Load board ID	Device number	Zero hour measurements Vf (V)		Forward Voltage Maintainence (%) 3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000
40000011504503 1C	D1		24.61	100.13	100.15	100.17	100.13	100.23	100.25	100.27	100.31	100.33	100.37	100.36
	D2		24.79	100.14	100.16	100.21	100.28	100.30	100.34	100.36	100.39	100.42	100.46	100.48
	D3		24.72	100.17	100.22	100.25	100.29	100.34	100.38	100.41	100.46	100.52	100.54	100.59
	D4		24.74	100.19	100.22	100.27	100.30	100.34	100.37	100.41	100.45	100.44	100.50	100.53
	D5		24.67	100.10	100.14	100.16	100.26	100.26	100.30	100.33	100.38	100.38	100.41	100.47
	D6		24.89	100.28	100.32	100.38	100.45	100.45	100.53	100.59	100.60	100.62	100.66	100.68
4C00001168140 31C	D1		24.72	100.13	100.15	100.26	100.29	100.34	100.34	100.41	100.40	100.52	100.57	100.57
	D2		24.57	100.13	100.17	100.21	100.25	100.30	100.33	100.36	100.36	100.42	100.45	100.47
	D3		24.67	100.15	100.19	100.24	100.30	100.31	100.32	100.34	100.40	100.42	100.47	100.47
	D4		24.71	100.03	100.08	100.12	100.14	100.16	100.21	100.21	100.26	100.24	100.25	100.27
	D5		24.66	100.14	100.19	100.21	100.30	100.32	100.37	100.46	100.48	100.46	100.54	100.55
	D6		24.69	100.11	100.20	100.26	100.28	100.32	100.33	100.39	100.44	100.47	100.48	100.53
AC00001144A5031C	D1		24.66	100.05	100.06	100.14	100.15	100.19	100.11	100.18	100.27	100.24	100.30	100.28
	D2		24.71	100.12	100.12	100.16	100.20	100.24	100.25	100.31	100.32	100.29	100.35	100.38
	D3		24.67	100.06	100.12	100.16	100.20	100.22	100.22	100.30	100.28	100.30	100.35	100.35
	D4		24.72	100.19	100.21	100.30	100.34	100.38	100.41	100.47	100.49	100.54	100.56	100.59
	D5		24.59	100.09	100.07	100.10	100.18	100.21	100.22	100.23	100.23	100.29	100.29	100.34
	D6		24.65	100.05	100.06	100.13	100.14	100.21	100.23	100.25	100.29	100.32	100.32	100.35
n				18	18	18	18	18	18	18	18	18	18	18
mean				100.1	100.2	100.2	100.2	100.3	100.3	100.3	100.4	100.4	100.4	100.5
median				100.1	100.2	100.2	100.3	100.3	100.3	100.3	100.4	100.4	100.5	100.5
std. dev.				0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
min				100.0	100.1	100.1	100.1	100.2	100.1	100.2	100.2	100.2	100.2	100.3
max				100.3	100.3	100.4	100.5	100.4	100.5	100.6	100.6	100.6	100.7	100.7

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Test Condition 3 105 °C 0.200 A

TABLE 4.0 - LUMEN MAINTENANCE RESULTS **GWP9LR34.PM**
Test Condition 3 105 °C 0.200 A

Photometric test drive current: 0.200 A
Photometric test ambient temperature: 25 ± 2 °C
Failures observed: none

Load board ID	Device number	Zero hour measurements Flux (lm)	Vf (V)	Lumen Maintenance (%) 3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000
0500001166BB031C	D1	713.19	24.70	100.0	99.2	98.1	96.6	95.2	94.1	93.4	92.5	91.8	91.0	90.3
	D2	716.77	24.76	99.8	99.1	98.2	97.2	96.3	95.6	94.9	94.4	93.8	93.2	92.5
	D3	710.44	24.60	99.4	98.4	97.3	95.8	94.6	93.6	92.6	91.9	91.1	90.2	89.3
	D4	706.47	24.74	99.8	99.0	98.0	96.7	95.5	94.5	93.6	92.6	91.8	90.8	89.8
	D5	718.28	24.74	99.7	99.0	97.9	96.7	95.7	94.7	93.9	93.1	92.2	91.4	90.5
	D6	715.83	24.57	100.1	99.5	98.5	97.2	95.9	95.0	94.1	93.3	92.5	91.7	91.0
2D00001165CA031C	D1	707.55	24.67	99.5	98.8	98.0	97.2	96.1	95.5	94.8	94.2	93.5	92.8	92.1
	D2	708.18	24.66	99.9	99.4	98.9	98.2	97.2	96.6	95.9	95.2	94.5	93.8	93.0
	D3	696.36	24.72	100.3	99.9	99.5	98.8	98.0	97.5	96.9	96.4	95.8	95.0	94.1
	D4	715.90	24.66	99.8	99.3	98.6	97.5	96.4	95.6	94.9	94.2	93.4	92.6	91.8
	D5	712.02	24.74	99.9	99.4	98.7	97.9	97.1	96.4	95.8	95.3	94.8	94.2	93.6
	D6	725.44	24.62	99.8	99.4	98.7	97.8	96.7	96.1	95.4	94.7	94.1	93.4	92.7
BF000011560103IC	D1	703.06	24.74	100.1	99.8	99.2	98.5	97.8	97.1	96.4	95.9	95.2	94.5	93.6
	D2	705.66	24.66	100.1	99.8	99.3	98.6	97.8	97.2	96.6	96.0	95.4	94.6	94.3
	D3	710.25	24.60	99.7	99.1	98.1	97.0	95.9	95.2	94.3	93.6	92.9	91.9	91.1
	D4	708.52	24.71	100.2	99.8	99.1	97.9	96.9	96.0	95.0	94.1	93.2	92.2	91.3
	D5	715.52	24.64	100.1	99.7	99.2	98.5	97.7	97.2	96.6	96.2	95.6	94.9	94.1
	D6	710.52	24.62	99.8	99.4	98.9	98.1	97.4	96.6	95.9	95.2	94.6	93.7	92.9
	n			18	18	18	18	18	18	18	18	18	18	18
	mean			99.9	99.3	98.6	97.6	96.6	95.8	95.1	94.4	93.7	92.9	92.1
	median			99.8	99.4	98.7	97.7	96.6	95.8	95.0	94.3	93.7	93.0	92.3
	std. dev.			0.2	0.4	0.6	0.8	1.0	1.1	1.2	1.3	1.4	1.5	1.6
	min			99.4	98.4	97.3	95.8	94.6	93.6	92.6	91.9	91.1	90.2	89.3
	max			100.3	99.9	99.5	98.8	98.0	97.5	96.9	96.4	95.8	95.0	94.3

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AE ((Ele.))

Test Condition 3 105 °C 0.200 A

TABLE 4.1 - CHROMATICITY SHIFT RESULTS **GWP9LR34.PM**

Test Condition 3 105 °C 0.200 A

Photometric test drive current: 0.200 A
Photometric test ambient temperature: 25 ± 2 °C
Failures observed: none

Load board ID	Device number	Zero hour measurements u'	v'		Chromaticity shift (Δu'v') 3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000
050000116BB031C	D1	0.2593	0.5259		0.0007	0.0011	0.0016	0.0022	0.0028	0.0032	0.0035	0.0038	0.0040	0.0043	0.0047
	D2	0.2595	0.5271		0.0006	0.0010	0.0013	0.0018	0.0021	0.0024	0.0026	0.0028	0.0029	0.0031	0.0034
	D3	0.2598	0.5264		0.0007	0.0012	0.0017	0.0022	0.0027	0.0030	0.0033	0.0036	0.0038	0.0043	0.0050
	D4	0.2603	0.5246		0.0006	0.0009	0.0014	0.0019	0.0023	0.0027	0.0030	0.0033	0.0036	0.0042	0.0049
	D5	0.2596	0.5257		0.0006	0.0009	0.0014	0.0018	0.0022	0.0025	0.0028	0.0031	0.0035	0.0040	0.0046
	D6	0.2597	0.5261		0.0006	0.0009	0.0013	0.0018	0.0023	0.0028	0.0031	0.0034	0.0037	0.0040	0.0045
2D00001165CA031C	D1	0.2601	0.5256		0.0008	0.0012	0.0016	0.0020	0.0023	0.0025	0.0028	0.0029	0.0032	0.0035	0.0040
	D2	0.2596	0.5263		0.0007	0.0010	0.0012	0.0015	0.0017	0.0020	0.0023	0.0024	0.0026	0.0029	0.0034
	D3	0.2595	0.5247		0.0007	0.0010	0.0013	0.0015	0.0017	0.0018	0.0020	0.0021	0.0023	0.0026	0.0034
	D4	0.2593	0.5271		0.0005	0.0008	0.0011	0.0015	0.0018	0.0021	0.0024	0.0026	0.0029	0.0031	0.0036
	D5	0.2593	0.5262		0.0007	0.0010	0.0013	0.0017	0.0019	0.0021	0.0023	0.0024	0.0026	0.0028	0.0031
	D6	0.2593	0.5270		0.0007	0.0009	0.0011	0.0016	0.0019	0.0022	0.0025	0.0027	0.0030	0.0031	0.0033
BF0000115601031C	D1	0.2603	0.5248		0.0007	0.0009	0.0011	0.0014	0.0016	0.0018	0.0021	0.0022	0.0023	0.0027	0.0035
	D2	0.2598	0.5257		0.0007	0.0009	0.0012	0.0014	0.0016	0.0018	0.0020	0.0021	0.0023	0.0026	0.0030
	D3	0.2596	0.5254		0.0007	0.0011	0.0015	0.0019	0.0022	0.0025	0.0028	0.0030	0.0033	0.0037	0.0041
	D4	0.2595	0.5251		0.0005	0.0008	0.0011	0.0015	0.0018	0.0021	0.0024	0.0027	0.0030	0.0037	0.0044
	D5	0.2593	0.5263		0.0005	0.0007	0.0010	0.0013	0.0014	0.0016	0.0018	0.0019	0.0021	0.0023	0.0030
	D6	0.2602	0.5253		0.0006	0.0009	0.0012	0.0015	0.0017	0.0020	0.0023	0.0025	0.0027	0.0030	0.0035
n					18	18	18	18	18	18	18	18	18	18	18
mean					0.0006	0.0010	0.0013	0.0017	0.0020	0.0023	0.0026	0.0028	0.0030	0.0033	0.0039
median					0.0007	0.0009	0.0013	0.0016	0.0019	0.0022	0.0025	0.0027	0.0029	0.0031	0.0036
std. dev.					0.0001	0.0001	0.0002	0.0003	0.0004	0.0004	0.0005	0.0005	0.0006	0.0006	0.0007
min					0.0005	0.0007	0.0010	0.0013	0.0014	0.0016	0.0018	0.0019	0.0021	0.0023	0.0030
max					0.0008	0.0012	0.0017	0.0022	0.0028	0.0032	0.0035	0.0038	0.0040	0.0043	0.0050

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Test Condition 3 105 °C 0.200 A

TABLE 4.2 - FORWARD VOLTAGE MAINTENANCE RESULTS **GWP9LR34.PM**
Test Condition 3 105 °C 0.200 A

Photometric test drive current: 0.200 A
Photometric test ambient temperature: 25 ± 2 °C
Failures observed: none

Load board ID	Device number	Zero hour measurements Vf (V)		Forward Voltage Maintainence (%) 3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000
05000011668B031C	D1		24.70	100.28	100.28	100.45	100.49	100.55	100.61	100.73	100.80	100.89	100.94	101.02
	D2		24.76	100.25	100.29	100.39	100.46	100.52	100.55	100.62	100.72	100.74	100.81	100.87
	D3		24.60	100.29	100.36	100.43	100.55	100.57	100.65	100.76	100.80	100.85	100.94	100.96
	D4		24.74	100.32	100.46	100.54	100.64	100.71	100.79	100.88	100.99	101.03	101.12	101.20
	D5		24.74	100.24	100.32	100.39	100.47	100.52	100.56	100.66	100.74	100.77	100.82	100.89
	D6		24.57	100.23	100.33	100.41	100.44	100.52	100.61	100.65	100.71	100.79	100.84	100.92
2D00001165CA031C	D1		24.67	100.26	100.33	100.39	100.47	100.49	100.49	100.60	100.66	100.70	100.77	100.78
	D2		24.66	100.33	100.40	100.53	100.66	100.73	100.79	100.88	100.95	101.04	101.13	101.21
	D3		24.72	100.30	100.39	100.50	100.62	100.68	100.73	100.84	100.92	100.98	101.08	101.13
	D4		24.66	100.32	100.37	100.49	100.57	100.59	100.72	100.76	100.84	100.89	100.98	101.02
	D5		24.74	100.34	100.36	100.50	100.60	100.68	100.75	100.82	100.87	100.96	101.05	101.05
	D6		24.62	100.19	100.27	100.28	100.38	100.43	100.53	100.52	100.58	100.61	100.65	100.67
BF0000115601031C	D1		24.74	100.23	100.30	100.46	100.52	100.57	100.60	100.74	100.76	100.80	100.87	100.92
	D2		24.66	100.26	100.36	100.47	100.54	100.57	100.64	100.72	100.80	100.81	100.88	100.91
	D3		24.60	100.23	100.32	100.41	100.48	100.58	100.58	100.68	100.72	100.77	100.80	100.88
	D4		24.71	100.26	100.31	100.39	100.48	100.56	100.63	100.67	100.72	100.76	100.81	100.88
	D5		24.64	100.24	100.34	100.43	100.46	100.52	100.59	100.62	100.70	100.74	100.80	100.84
	D6		24.62	100.27	100.34	100.46	100.52	100.62	100.68	100.73	100.79	100.87	100.94	100.98
		n		18	18	18	18	18	18	18	18	18	18	18
		mean		100.3	100.3	100.4	100.5	100.6	100.6	100.7	100.8	100.8	100.9	101.0
		median		100.3	100.3	100.4	100.5	100.6	100.6	100.7	100.8	100.8	100.9	100.9
		std. dev.		0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		min		100.2	100.3	100.3	100.4	100.4	100.5	100.5	100.6	100.6	100.7	100.7
		max		100.3	100.5	100.5	100.7	100.7	100.8	100.9	101.0	101.0	101.1	101.2

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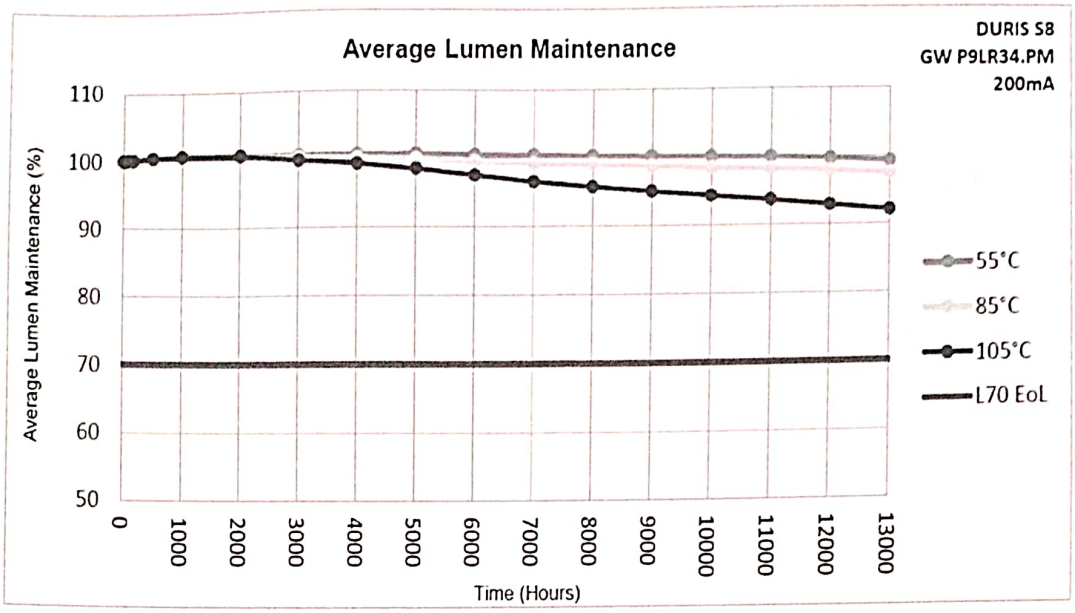
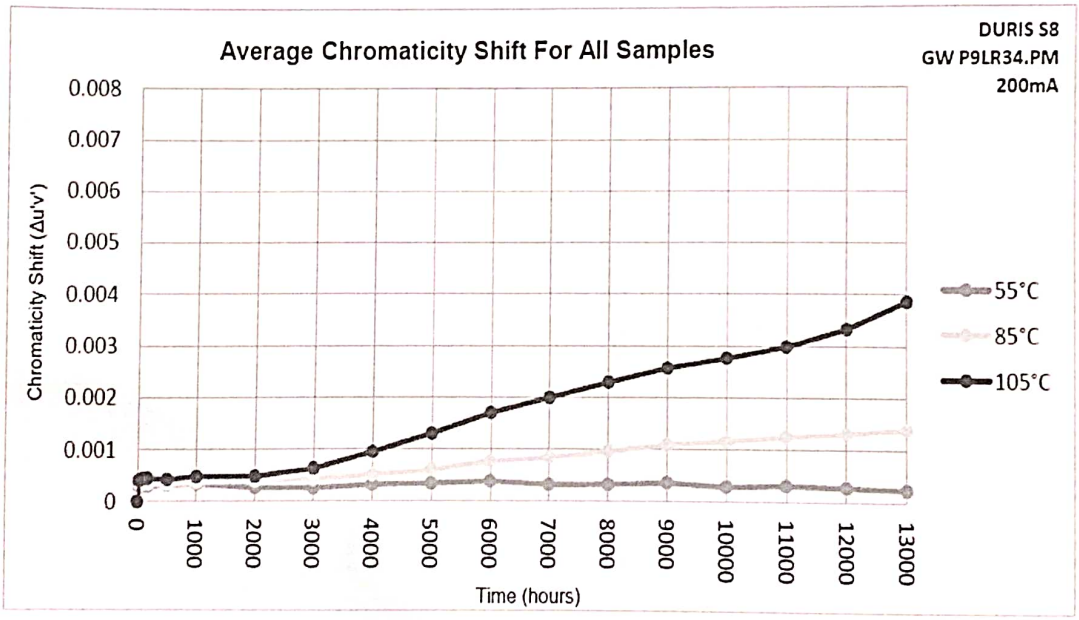
5.0 Charts:





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6.0 Additional Information

6.1 Auxilliary Equipment

Lifetest thermal chamber:	Orb Optronix Thermal Platform - resistive heating, liquid cooling, no forced air flow
Lifetest current source:	Orb Optronix 12-Channel Driver
Photometric test current source:	Keithley 2425
Photometric test thermal control:	Orb Optronix TEC-100
Spectrometer:	Instrument Systems, CAS 140CT
Integrating Sphere:	Gamma Scientific 20"
Photometric reference standards:	LabSphere SCL-50

6.2 Additional Test Information

6.3 Photographs

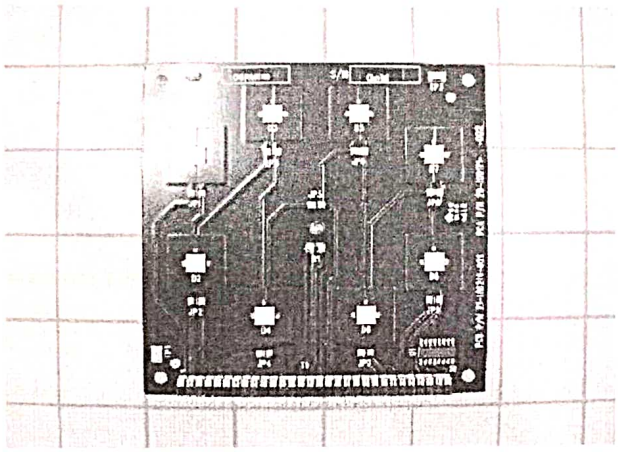

Fig. 1 DURIS S8 load board example.

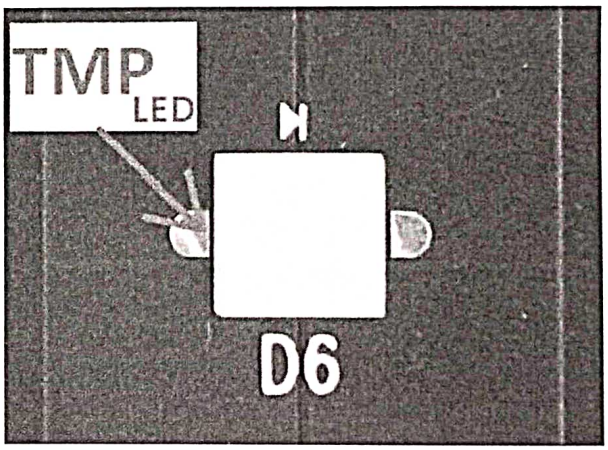

Fig. 2 DURIS S8 GW P9LR34.PM LED and temperature measurement point.

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6.4 Dimensional Drawing*

* all dimension in millimeters

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Appendix A:
Energy Star® LM-80 Application

ENERGY STAR® LM-80 Cover Page

Administrative Information

Tested subcomponent series	DURIS® S 8
Tested subcomponent model number	GW P9LR34.PM
Report issue date	16th July 2020
Report revision date (if applicable)	Not Applicable
Testing start date	6th Dec 2018
Testing completion date	16th July 2020
DUT sampling method	According to ANSI/IES LM-80 Test Method

DUT Identification

DUT manufacturer's name	OSRAM Opto Semiconductors (Malaysia) Sdn. Bhd.
DUT identification	GW P9LR34.PM
Description of DUT	LED Package

DUT Characteristics

Total input power (W)	4.94
Average current density per LED die (mA/mm²)	351
Average power density per LED package (W/mm²)	0.20
Representative CRI (Ra) of the tested sample set	CRI70
Minimum die edge to die edge spacing (mm)	0.30

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Appendix B:
Lumen Maintenance Projection (IES TM-21-11)

For Information Only!

1. General Information

Description of LED light source tested	DURIS® S 8 GW P9LR34.PM
Sample size per temperature	24 devices @55°C / 18 devices @85°C and 105°C
LED drive current used in the test	200 mA
Test duration	13,000 hours
Test duration used for projection	6,000 hours to 13,000 hours

2. Projection Data

	I	II	Interpolation	III
Case temperature (solder point)	T_S = 55 °C	T_S = 85 °C	T_S = 87 °C	T_S = 105 °C
α	1.680E-06	2.965E-06	3.291E-06	7.998E-06
B	1.017E+00	1.014E+00	1.018E+00	1.022E+00
Reported L70	>78,000 hours	>71,500 hours	>71,500 hours	47,332 hours
Reported L80	>78,000 hours	>71,500 hours	>71,500 hours	30,637 hours
Reported L90	72,696 hours	40,261 hours	37,476 hours	15,911 hours

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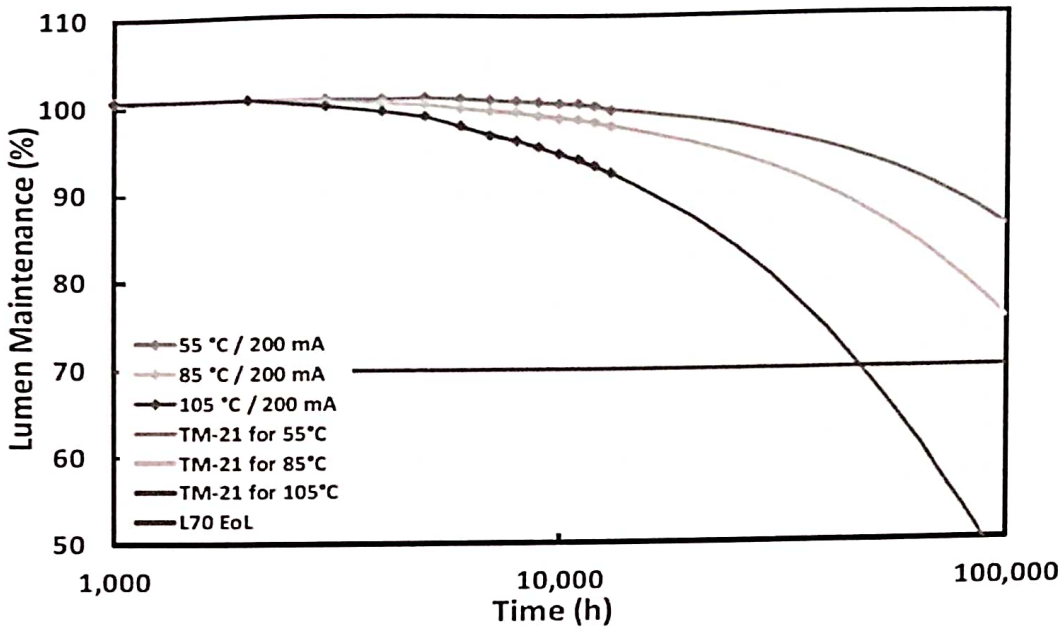
3. Graphic chart



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Appendix C:
Additional Models Covered By Testing

The 28 September 2017 *ENERGY STAR® Requirements for the Use of LM-80 Data* defines conditons for which a LM-80 report is applied to cover models that have not been directly tested.

The test results in this report applies to the following list of models:

- DURIS® S 8 GW P9LR34.PM with CCT 2200 K – 6500 K up to 200mA
- DURIS® S 8 GW P9LR35.PM with CCT 2200 K – 6500 K up to 800mA
- DURIS® S 8 GW P9LR34.PM Gen5 with CCT 3000 K – 6500 K up to 200mA
- DURIS® S 8 GW P9LR35.PM Gen5 with CCT 3000 K – 6500 K up to 800mA

Note: The devices are stressed and tested at average current density per LED die of 351mA/mm^2. This report can be referenced when the current employed in application is lower than the specified current of the respective devices as stated above.

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Disclaimer

Please carefully read the below terms and conditions before using the Information.
If you do not agree with any of these terms and conditions, do not use the Information.

The Information contained in this document does not constitute an independent warranty. The committed behavior is described in the Product data sheet.

Further explanations:
Data: The Data used in this Document consider the reliability test results under the mentioned driving conditions only. For Product information on the maximum operating conditions please refer to the Product data sheet or contact your local sales partner.
Conditions: The conditions for the generation of the data are as follows:
1. The Data and curves shown in this Document are based on experiments carried out under laboratory conditions on a random sample size of LED with readouts at discrete readout times (where applicable). Thus, the Data above represent a limited number of production lots only and may differ between different assembly lots over time (including chip or package changes). Thus, the behavior of the LED in the final application may differ from the Data. The behavior of the LED at conditions or readout times deviating from those stated above may not be deduced from the Data.
2. For long term operation additional failure modes of the chip or package can occur which are not shown in this Document.
3. Possible differences in the thermal management of OSRAM OS and customer's setup may lead to a different aging behavior.
4. The lifetime projection data presented in this Document has been evaluated in accordance with the lifetime extrapolation method described and defined in IES TM-21-11. The lifetime projection is based on the Data shown in this Document. The Data had been collected and assembled according to IES LM-80-15.

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END OF DOCUMENT

OSRAM Opto Semiconductors
GmbH

Head Office

Leibnizstrasse 4
93055 Regensburg, Germany
Phone +49 941 850-5
Fax +49 941 850-1002
www.osram-os.com

OSRAM
Opto Semiconductors

SURYA TECHNOLOGY & INNOVATION CENTRE
SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Test Report for LED Lamp/Luminaire

Report Number	PTR-L-2022-SL0107
Date	16/04/2022
Testing Agency	Surya Technology & Innovation Centre
Customer Details	
Surya Roshni Limited LBG Division Padma Tower -1 Rajendra Palace New Delhi 110008	
Product Catalogue Reference	SLE UL 72W IP66 NGN/K
Brand	SURYA
Sample ID:	2216D09
Test Sample Description	SLE UL 72W IP66 NGN/K, 240 V ac, 50 Hz
Equipment used	**Validity of calibration**
LMT Mirror Goniophotometer GO-DS 2000 Lab ID. STIC/PH/GO-DS /00,01,02	Calibrated by NPL Valid till 24/11/2022
YOKOGAWA Power Meter WT2010 Lab ID. STIC/PH/WT2010/03	Calibrated by Anshaankan (India) Pvt.Ltd. Valid till 27/05/2022
AC Power Supply Chroma 6430 Lab ID. STIC/PH/6430/04	Calibrated by Anshaankan (India) Pvt.Ltd. Valid till 25/05/2022
Reference Standard light Source D204 E27 Omnidirectinal TH Lamp ID.306/OPT/2017	Calibrated by NPL Valid till 18/12/2022
Test procedure applicable	MS-2L-015
Test Details:	**Document References/Standard:**
• Light Intensity Distribution • Luminous Flux Measurement • Electrical Parameters Measurement	LM-79-08/ IS 16106:2012
Disclaimer: This report shall not be reproduced, except in full. The results of test in this report apply only to sample item/ product tested. No sampling was conducted by this laboratory for the test item/product mentioned overleaf.	

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	Prepared By		Approved By
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Elec.)

SURYA TECHNOLOGY & INNOVATION CENTRE
SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Electrical & Photometric Test Report	
Sample ID	2216D09
Report Number	PTR-L-2022-SL0107
Catalogue Reference	SLE UL 72W IP66 NGN/K
Date of Testing	16/04/2022
Receipt Date	16/04/2022
Condition of sample	Good
Orientation of Lamp/Luminaire	Downward, no tilt
Photometric Distance	19.083 m
Test Conditions:	
Standard applicable	LM-79-08
Ambient Temperature	24.5° C
Relative Humidity	51 %
Test voltage	240.0 V ac
Frequency	50 Hz
Stabilization Time	60 min
Total operating time	90 min
Measured Electrical Parameters:	
Supply Voltage	240.07 V
Input Current	0.304 A
Total Power	72.08 W
Power Factor	0.985
Photometric Measurement Data:	
Total Measured Lumen	7272.15 lm
Efficacy	100.89 lm/W
Beam Angle Measured	NA
Spread	NA
Throw	NA
Intensity cd (Maximum)	NA
Light Intensity Distribution Diagram	Attached (Refer to page no. 3)
Zonal Flux Diagram(street)	Attached (Refer to page no. 4)
Spectrum report	Attached (Refer to page no. 5)

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Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Elc.)

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SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

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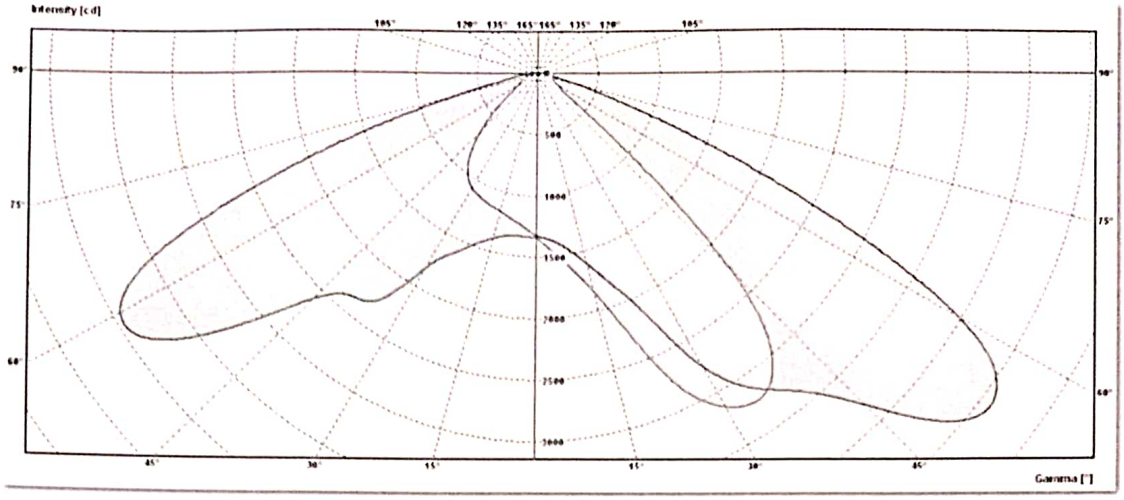
Light Intensity Distribution Diagram-



Catalogue Reference	SLE UL 72W IP66 NGN/K	Sample ID	2216D09

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Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

SURYA TECHNOLOGY & INNOVATION CENTRE
SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
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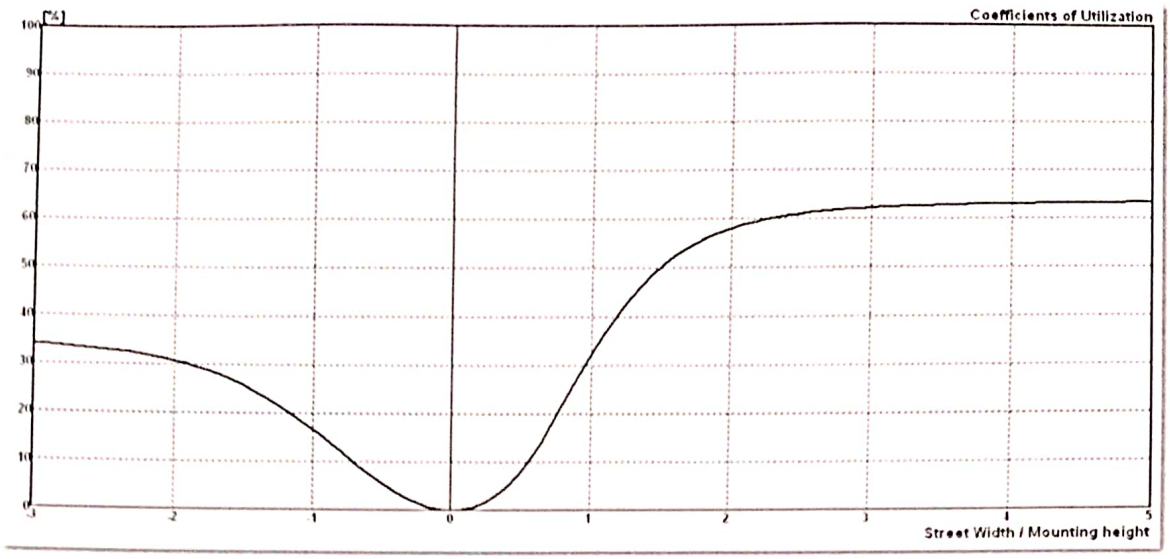
Zonal Flux Diagram (Street) –



Catalogue Reference	SLE UL 72W IP66 NGN/K	**Sample ID**	2216D09

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SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

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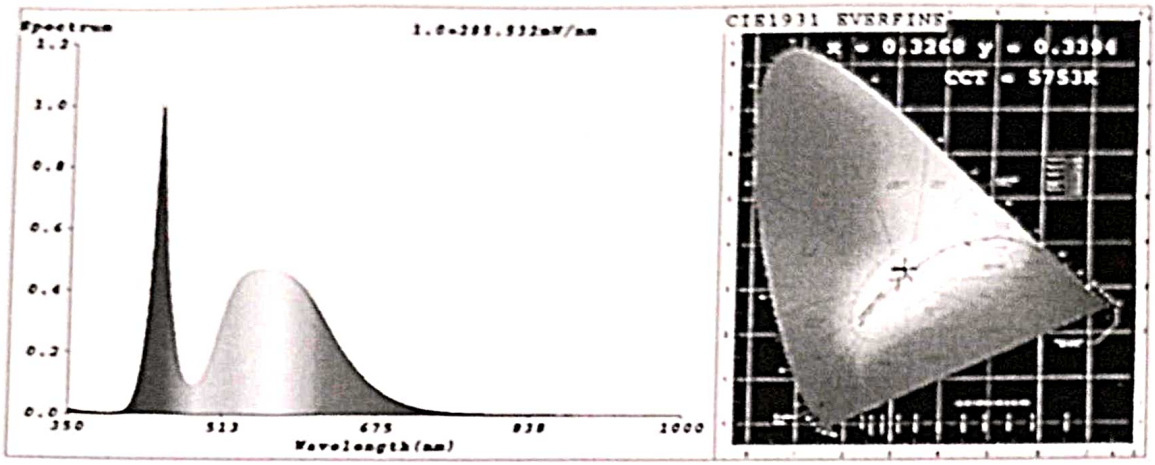
Spectrum Report –



Color Parameters:

Chromaticity Coordinate:x-0.3268 y-0.3394/u'-0.2037 v'-0.4759

CCT-5753K(Duv-0.0017) Dominant WL:Ld -504.4nm Purity-2.0%

Ratio:R-13.3% G-83.3% B-3.4%||Peak WL:Lp-445.0nm FWHM-18.6nm

Render Index:Ra-72.7

R1 -72	R2 -75	R3 -77	R4 -75	R5 -73	R6 -68	R7 -79	
R8 -62	R9 -0	R10-41	R11-74	R12-47	R13-71	R14-87	R15-67

Summary of Test Results

Test Parameter	Standard	Sample ID	Result
Electrical & Photometry	LM-79-08	2216D09	Pass

----------End of Test Report----------

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Signature			
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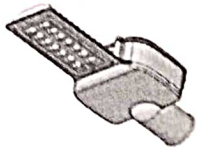


NEWGEN - 72

A LED Streetlight luminaire for Road & Street lighting applications.

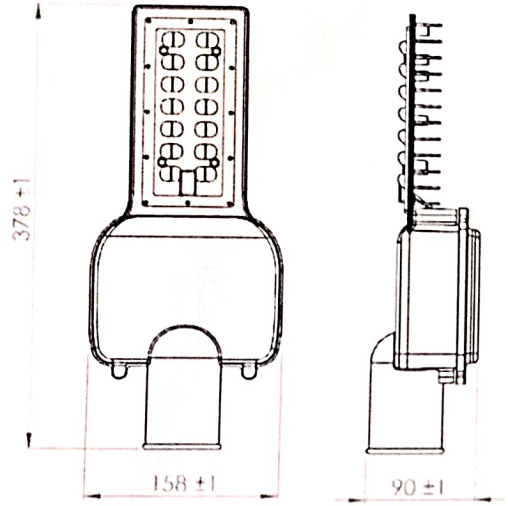
New era of street lighting with energy saving and long life

SURYA

SLE UL 72W IP66 NGN/K

Technical Specification:

Class-1



Main Housing, frame :	Powder coated, pressure die-cast Aluminum housing.
Front Cover:	Polycarbonate lens with silicon gasket.
LED:	LM80 certified high power LED
Lens:	Suitable secondary IP lens for better light distribution
Gear:	Integral, Electronic, constant current driver.
Maintainance:	Top maintainable.
Internal Wiring:	Teflon insulated, Cu. Conductor.
Hardware:	SS & Ms zinc plated & passivated.
Ingress protection:	IP66
Lumen maintenance:	50,000 Hrs @ L70
Operating temperature:	-10°C to 50°C
Rated voltage & frequency:	240V, 50Hz AC

 # Energy saving
 # Long life
 # Easy installation & maintenance

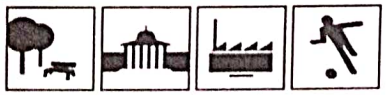
Cat. Ref.	Wattage	Current	Pf	Ithd	Efficacy	CCT	CRI
SLE UL 72W IP66 NGN/K	72±10%	≤0.34A	≥ 0.95	≤ 10%	≥100 lm/W	5700K	≥ 70

Protections: Open & Short circuit protection, reverse polarity protection and surge protection 5KV inbuilt & 10KV SPD

Applicable Standard: IS 10322(Pt.5/Sec.3)1987 / IEC 60598

Mounting :
Suitable for 50mm pipe bracket

Applications:
Road & Street lighting, Area lighting, Industry complex lighting applications.



DRAWN BY:	AS	V-Code	KP-2021P
CHECKED BY:	RJ	Revision	0
APPROVED BY:	AT	Valid up to	**31.03.23**

Surya Roshni Ltd.,
Padma Tower-I,
Rajendra place, Delhi

As improvement in design & method of manufacturing is a continuous process, the product supplied may differ in detail from data given here.

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SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

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Test Report for LED Lamp/Luminaire

Report Number	STIC-LM79-2022-LT0124
Date	18/05/2022
Testing Agency	Surya Technology & Innovation Centre
Customer Details	
Surya Roshni Limited LBG Division Padma Tower -1 Rajendra Palace New Delhi 110008	
Product Catalogue Reference	PLX SLE UL 90W IP66
Brand	SURYA
Sample ID:	2218E07
Test Sample Description	PLX SLE UL 90W IP66, 240 V ac, 50 Hz
Equipment used	**Validity of calibration**
LMT Mirror Goniophotometer GO-DS 2000 Lab ID. STIC/PH/GO-DS /00,01,02	Calibrated by NPL Valid till 24/11/2022
YOKOGAWA Power Meter WT2010 Lab ID. STIC/PH/WT2010/03	Calibrated by Anshaankan (India) Pvt.Ltd. Valid till 27/05/2022
AC Power Supply Chroma 6430 Lab ID. STIC/PH/6430/04	Calibrated by Anshaankan (India) Pvt.Ltd. Valid till 25/05/2022
Test procedure applicable	MS-2L-015
Test Details:	**Document References/Standard:**
• Light Intensity Distribution • Luminous Flux Measurement • Electrical Parameters Measurement	LM-79-08 / IS 16106:2012

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Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Ele.)

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SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

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Electrical & Photometric Test Report	
Sample ID	2218E07
Report Number	STIC-LM79-2022-LT0124
Catalogue Reference	PLX SLE UL 90W IP66
Date of Testing	18/05/2022
Receipt Date	18/05/2022
Condition of sample	Good
Orientation of Lamp/Luminaire	Downward, no tilt
Photometric Distance	19.083 m
Test Conditions:	
Standard applicable	LM-79-08
Ambient Temperature	25.3° C
Relative Humidity	52 %
Test voltage	240.0 V ac
Frequency	50 Hz
Stabilization Time	60 min
Total operating time	90 min
Measured Electrical Parameters:	
Supply Voltage	240.07 V
Input Current	0.379 A
Total Power	90.08 W
Power Factor	0.988
Photometric Measurement Data:	
Total Measured Lumen	9201.67 lm
Efficacy	102.15 lm/W
Beam Angle Measured	NA
Spread	NA
Throw	NA
Intensity cd (Maximum)	NA
Light Intensity Distribution Diagram	Attached (Refer to page no. 3)
Zonal Flux Diagram(street)	Attached (Refer to page no. 4)
Spectrum Report	Attached (Refer to page no. 5)

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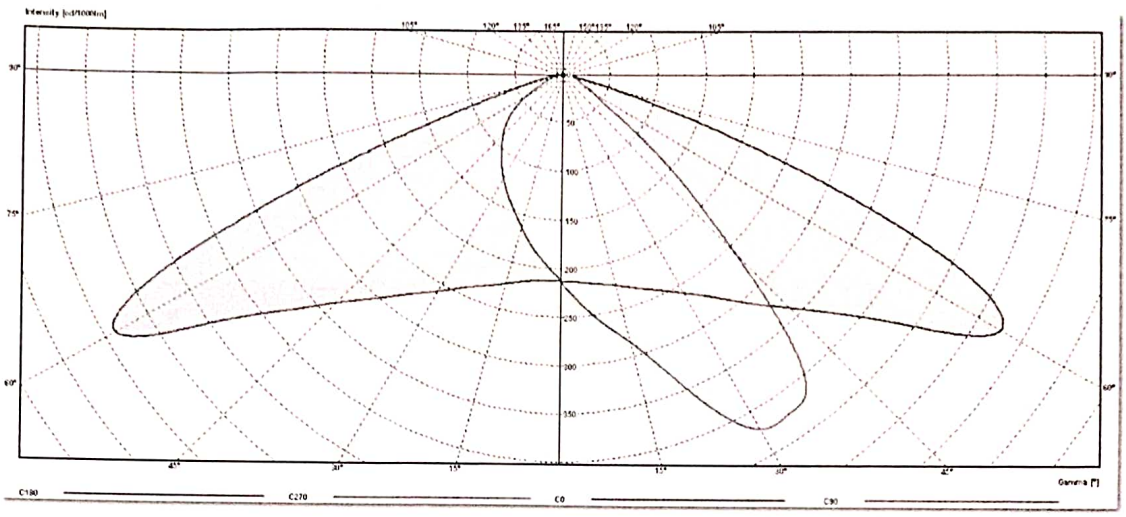
	Prepared By		**Reviewed By**
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Elo.)

SURYA TECHNOLOGY & INNOVATION CENTRE
SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Light Intensity Distribution Diagram-



Catalogue Reference	PLX SLE UL 90W IP66	Sample ID	2218E07

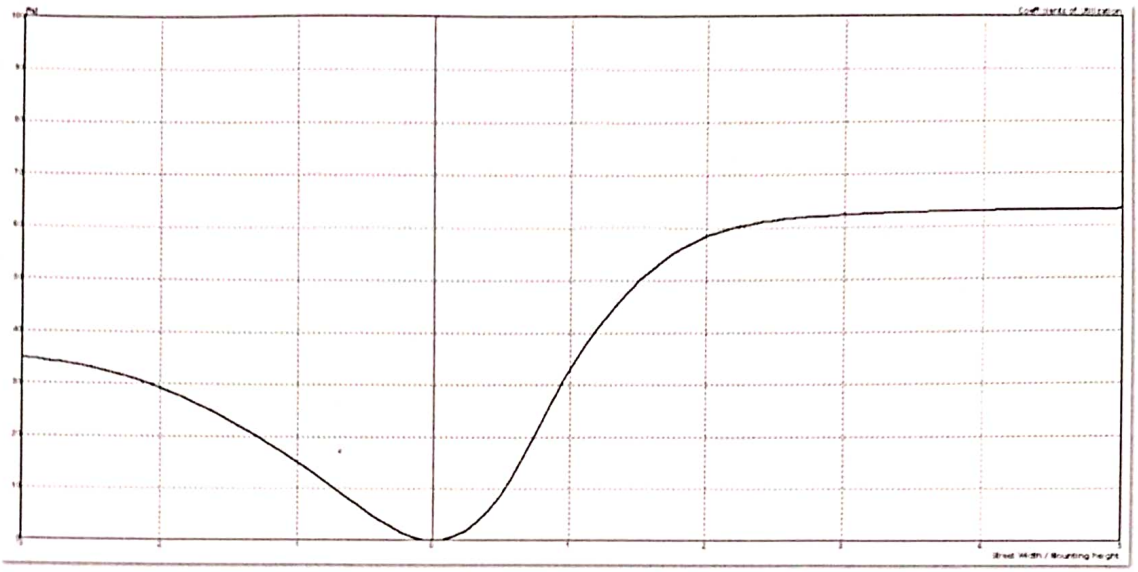
SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		Reviewed By
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Ele.)

SURYA TECHNOLOGY & INNOVATION CENTRE
SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Zonal Flux Diagram (Street) –



Catalogue Reference	PLX SLE UL 90W IP66	Sample ID	2218E07

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		Reviewed By
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE - (Elec.)

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SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

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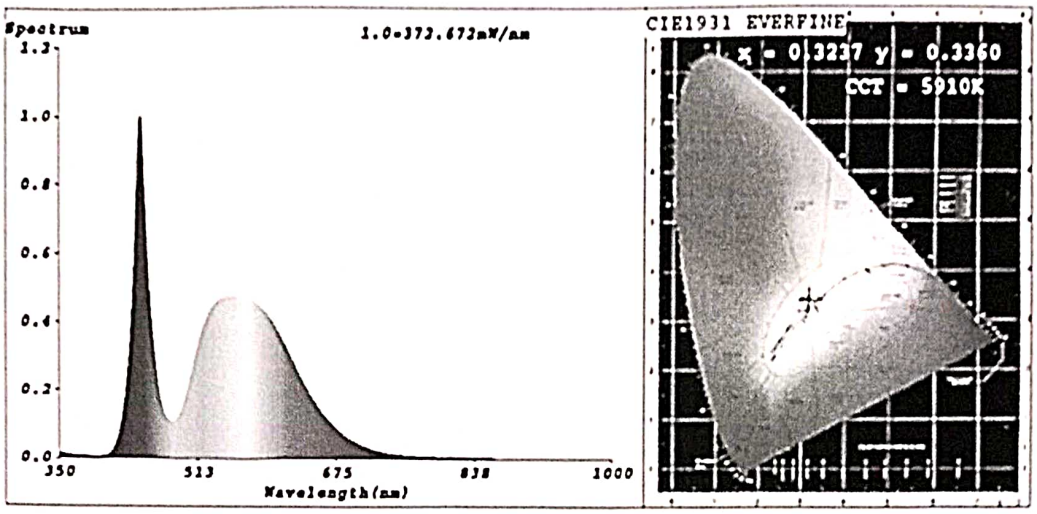
Spectrum Report –



Color Parameters:

Chromaticity Coordinate:x=0.3237 y=0.3360/u'=0.2028 v'=0.4736
CCT=5910K(Duv=0.0014) Dominant WL:Ld =495.3nm Purity=3.1%
Ratio:R=13.2% G=83.1% B=3.6%||Peak WL:Lp=445.3nm FWHM=19.7nm
Render Index:Ra=73.7

R1 =73	R2 =76	R3 =78	R4 =76	R5 =74	R6 =69	R7 =81	
R8 =63	R9 =0	R10=43	R11=75	R12=47	R13=73	R14=87	R15=68

Summary of Test Results

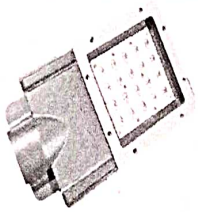
Test Parameter	Standard	Sample ID	Result
Electrical & Photometry	LM-79-08	2218E07	Pass

----------End of Test Report----------

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		Reviewed By
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Elec.)

AE (Elg.)



Pollux - 90

A LED Streetlight luminaire for Road & Street lighting applications.

New era of street lighting with energy saving and long life

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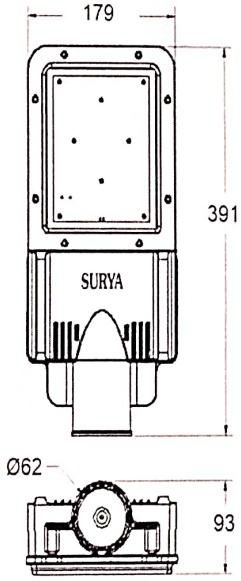
PLX SLE UL 90W IP66

Technical Specification:

Class-1



Tolerance ± 10mm

Housing:	Powder coated, pressure die-cast Aluminum housing.
Front Cover:	Clear toughened glass with synthetic rubber gasket.
LED:	LM80 certified high power LED.
Lens:	Suitable secondary lens for better light distribution.
Gear:	Integral, Electronic, CC driver.
Maintainance:	Top maintainable.
Internal Wiring:	PVC/Rubber insulated, Cu. Conductor.
Hardware:	SS & Ms zinc plated & passivated.
Ingress protection:	IP66
Impact resistance:	IK07
Lumen maintenance:	50,000 Hrs @ L70
Operating temperature:	-10°C to 50°C
Rated voltage & frequency:	240V, 50Hz AC

 # Energy saving
 # Long life
 # Easy installation & maintenance

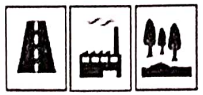
Cat. Ref.	Wattage	Current	Pf	Ithd	Efficacy	CCT	CRI
PLX SLE UL 90W IP66	90±10%	≤0.43A	≥ 0.95	≤ 10%	≥ 100lm/W	5700K	≥ 70

Protections: Open & Short circuit protection, reverse polarity protection and surge protection of 5KV Internal & 10KV External.

Applicable Standard: IS 10322(Pt.5/Sec.3)1987 / IEC 60598

Mounting :
Suitable for 50mm pipe bracket

Applications:
Road & Street lighting, Area lighting, Industry complex lighting applications.



DRAWN BY:	AS	V-Code	KP-2017P
CHECKED BY:	NC	Revision	0
APPROVED BY:	AT	Valid up to: 31-03-2023	**Sheet 1 of 1**

Surya Roshni Ltd.,
Padma Tower-I,
Rajendra place, Delhi

As improvement in design & method of manufacturing is a continuous process, the product supplied may differ in detail from data given here.

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

SURYA

Date: 18/05/2022

TYPE TEST REPORT

Product	:	90W LED Streetlight Luminaries suitable for 240V, 50Hz, 1 Ø, AC supply
Product Code	:	PLX SLE UL 90W IP66
Brand Name	:	SURYA
Document references	:	IS 10322(Pt.5/Sec.3)-2012. IS 16103 (Pt.1& Pt.2):2012, IS 16104:2012, IS 16107(Pt.2/Sec. 1):2012, LM79, & TDS

Sr. No.	Requirements		Observation	Verdict
1	Visual examination	The finishing and workmanship shall be OK and acceptable	Finishing and workmanship found to be OK and acceptable Satisfactory	Pass
2	Dimensions	Shall be as per TDS	As per TDS Satisfactory	Pass
3	Marking	Clause 6 of IS:10322(Pt.1) & Clause 4 of IS:16107(pt.2/Sec.1)2012 shall apply, Shall be clear and legible	Surya Roshni Limited, Made In India, 240V_{AC}, 50Hz, 1Ø, IP 66, Cat. Ref.: PLX SLE UL 90W IP66, Wattage- 90W Lamp type – LED Satisfactory	Pass
4	Construction	As per IS:10322(Pt. 2) shall apply, together with the requirements of 6.1 to 6.6	Aluminum Die cast housing(LM6), No sharp edges, IP66, Synthetic rubber gasket, Toughened Clear Glass, Top maintainable, Osram LED, optical lens for LED, Electronic driver, Class-1. Satisfactory	Pass
5	Creepage distance and Clearance	Shall be ≥ 3mm and ≥ 4mm	>3mm >4mm Satisfactory	Pass
6	Provision for Earthing	The provision given in 2.0 of IS:10322(Pt.2) shall apply	Earth contact Resistance <0.5 Ω, Leakage current < 1.0 mA Satisfactory	Pass
7	Terminals	As per IS:10322(Pt.2) shall apply	Satisfactory	Pass

AE (Elc.)

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

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Sr. No.	Requirements		Observation	Verdict
8	External and internal wiring	Clause 19 of IS:10322(Pt.2) shall apply	Satisfactory	Pass
9	Protection against Electric Shock	Clause 21 of IS:10322(Pt.2)shall apply	Test finger does not contact any live parts Satisfactory	Pass
10	Mechanical Strength	Clause 5 of IS:10322(Pt.4) shall apply	Doesn't show any damage IK07 Satisfactory	Pass
11	Endurance test and	The provision of 6 of IS:10322(Pt.4) shall apply At 25°C Ambient	No parts shall be damaged, and unserviceable, unsafe, Marking still legible and the Luminaires perform normally. Satisfactory	Pass
12	Thermal test	Heat sink MCPCB Led Ts Driver Tc	52°C, 68°C 73°C 72°C Satisfactory	Pass
13	Resistance to dust and Moisture Humidity test	The provision of 2 of IS:10322(Pt.4) shall apply Test for ingress of dust and Moisture (IP66) Humidity test at 95% of relative humidity shall show no damage effecting compliance with the requirement. Insulation Resistance Shall be ≥ 2MΩ on application of 500V DC Electric strength test Shall withstood a voltage of 1.5KV for 1 Min	No ingress of dust and water Satisfactory No damage observed and found in compliance with the requirement >20 MΩ Satisfactory Withstood 1.5KV without MOV Satisfactory	Pass Pass Pass Pass
14	Resistance to heat, fire & Tracking	On plastic materials only Resistance to heat Resistance to flame & Ignition	The diameter of impression <2mm The sample under test and any gas produced during the test doesn't ignite. Satisfactory	Pass Pass
15	Operating Voltage Range	The luminaries should be operable with auto adjustable 140-270V supply Voltage using the same driver	Luminaries operable within 140V - 270V supply Voltage with the same driver	Pass

AE (Ele.)

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

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Sr. No.	Requirements		Observation	Verdict
Test Voltage 240V				
16	Input Wattage	Power Consumption of the complete System, including Driver Losses 90W + 10%	90.4W	Pass
17	Input Power Factor	> 0.95	0.976	Pass
18	Max. Input Current	<434mA	385Ma	Pass
19	THD	< 10%	6.2%	Pass
20	Electronic LED Driver efficiency	>85%	87.2%	Pass
21	Surge Protection	5KV (Internal) & 10KV SPD	Withstood 5KV & 10KV	Pass
22	Short circuit protection	Protected against output short circuiting	Protected	Pass
23	Open circuit protection	Protected against output open circuiting	Protected	Pass
24	Reverse polarity	Shall be protected against reverse polarity.	Protected	Pass
25	Electrical Protection	Phase to phase protection of 440V	Protected	Pass

Issued by

RAKESH JAISWAR
Deputy Manager Professional lighting

AE (Elé.)

SURYA TECHNOLOGY & INNOVATION CENTRE
SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Test Report for LED Lamp/Luminaire

Report Number	STIC-LM79-2022-LT0042
Date	22/02/2022
Testing Agency	Surya Technology & Innovation Centre
Customer Details	
Surya Roshni Limited LBG Division Padma Tower -1 Rajendra Palace New Delhi 110008	
Product Catalogue Reference	PLX SLE UL 90W IP66 L65
Brand	SURYA
Sample ID:	2222B07
Test Sample Description	PLX SLE UL 90W IP66 L65, 240 V ac, 50 Hz
Equipment used	**Validity of calibration**
LMT Mirror Goniophotometer GO-DS 2000 Lab ID. STIC/PH/GO-DS /00,01,02	Calibrated by NPL Valid till 24/11/2022
YOKOGAWA Power Meter WT2010 Lab ID. STIC/PH/WT2010/03	Calibrated by Anshaankan (India) Pvt.Ltd. Valid till 27/05/2022
AC Power Supply Chroma 6430 Lab ID. STIC/PH/6430/04	Calibrated by Anshaankan (India) Pvt.Ltd. Valid till 25/05/2022
Test procedure applicable	MS-2L-015
Test Details:	**Document References/Standard:**
• Light Intensity Distribution • Luminous Flux Measurement • Electrical Parameters Measurement	LM-79-08 / IS 16106:2012

Disclaimer:
This report shall not be reproduced, except in full.
The results of test in this report apply only to sample item/ product tested.
No sampling was conducted by this laboratory for the test item/product mentioned overleaf.

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		**Reviewed By**
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Ele.)

SURYA TECHNOLOGY & INNOVATION CENTRE
SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Electrical & Photometric Test Report	
Sample ID	2222B07
Report Number	STIC-LM79-2022-LT0042
Catalogue Reference	PLX SLE UL 90W IP66 L65
Date of Testing	22/02/2022
Receipt Date	22/02/2022
Condition of sample	Good
Orientation of Lamp/Luminaire	Downward, no tilt
Photometric Distance	19.083 m
Test Conditions:	
Standard applicable	LM-79-08
Ambient Temperature	25.3° C
Relative Humidity	52 %
Test voltage	240.0 V ac
Frequency	50 Hz
Stabilization Time	60 min
Total operating time	90 min
Measured Electrical Parameters:	
Supply Voltage	240.07 V
Input Current	0.375 A
Total Power	88.40 W
Power Factor	0.981
Photometric Measurement Data:	
Total Measured Lumen	9321.78 lm
Efficacy	105.45 lm/W
Beam Angle Measured	NA
Spread	NA
Throw	NA
Intensity cd (Maximum)	NA
Light Intensity Distribution Diagram	Attached (Refer to page no. 3)
Zonal Flux Diagram(street)	Attached (Refer to page no. 4)
Spectrum report	Attached (Refer to page no. 5)

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		**Reviewed By**
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Ele.)

SURYA TECHNOLOGY & INNOVATION CENTRE
SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
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Email: surya@sroshni.com
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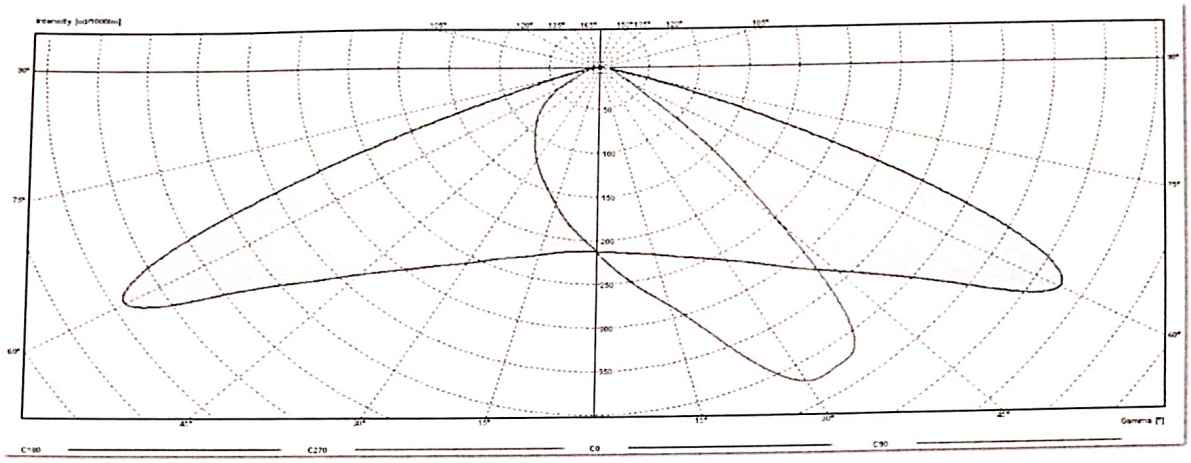
SURYA

Light Intensity Distribution Diagram-



Catalogue Reference	PLX SLE UL 90W IP66 L65	Sample ID	2222B07

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		Reviewed By
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

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SURYA ROSHNI LTD.
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D-63, Hosiery Complex Phase-II
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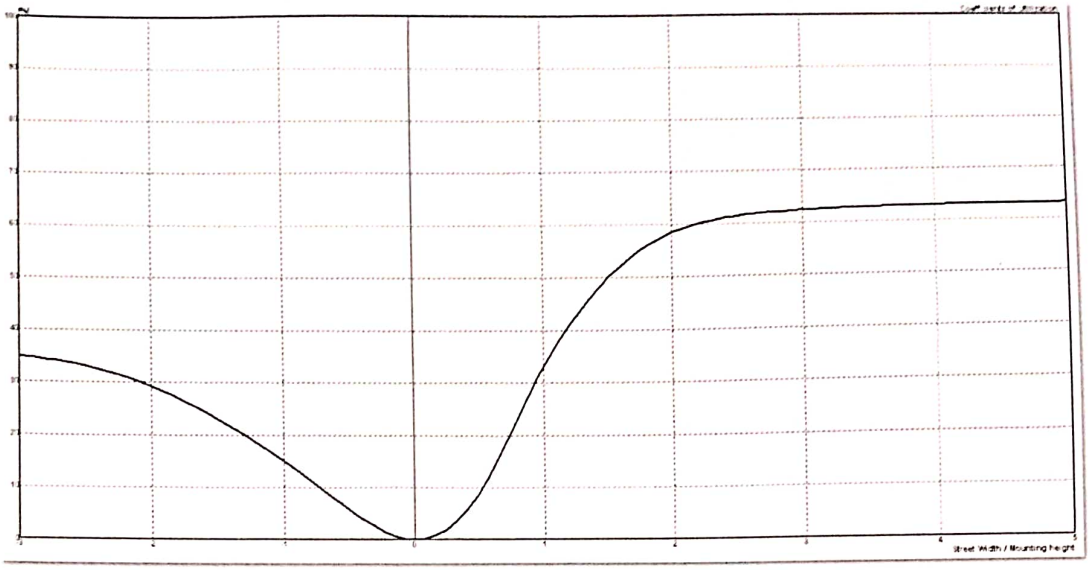
Zonal Flux Diagram (Street) –



Catalogue Reference	PLX SLE UL 90W IP66 L65	Sample ID	2222B07

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		Reviewed By
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

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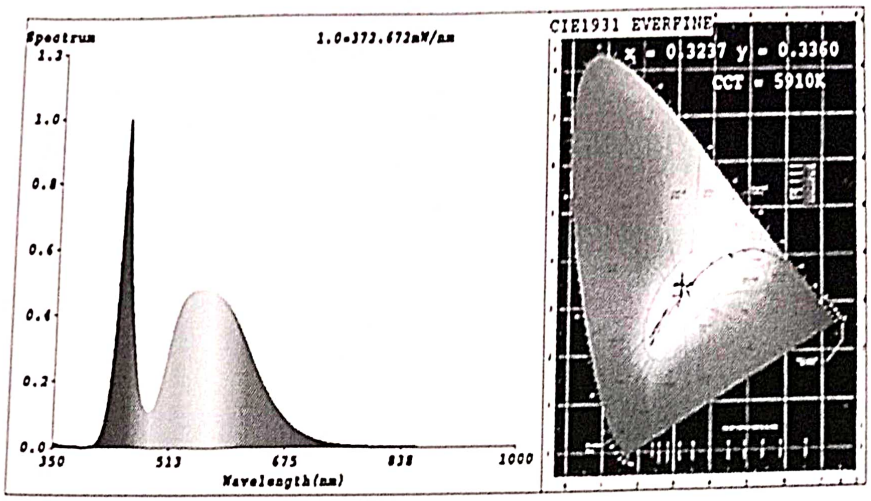
SURYA

Spectrum Report –



Color Parameters:

Chromaticity Coordinate:x=0.3237 y=0.3360/u'=0.2028 v'=0.4736

CCT=5910K(Duv=0.0014) Dominant WL:Ld =495.3nm Purity=3.1%

Ratio:R=13.2% G=83.1% B=3.6%||Peak WL:Lp=445.3nm FWHM=19.7nm

Render Index:Ra=73.7

R1 =73	R2 =76	R3 =78	R4 =76	R5 =74	R6 =69	R7 =81	
R8 =63	R9 =0	R10=43	R11=75	R12=47	R13=73	R14=87	R15=68

Summary of Test Results

Test Parameter	Standard	Sample ID	Result
Electrical & Photometry	LM-79-08	2222B07	Pass

----------End of Test Report----------

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		Reviewed By
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

Pollux - 90

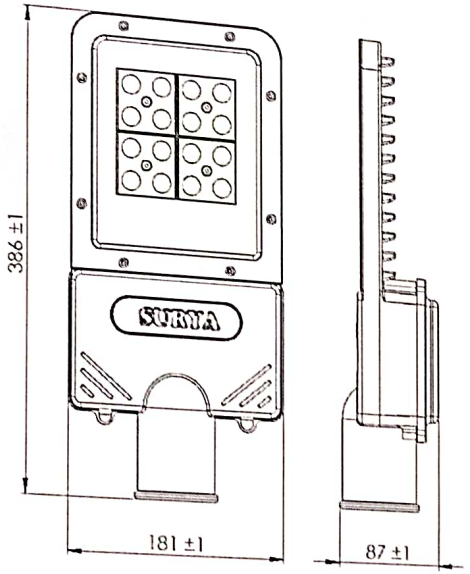
A LED Streetlight luminaire for Road & Street lighting applications.

New era of street lighting with energy saving and long life

SURYA

PLX SLE UL 90W IP66 L65

Class-1



Tolerance ± 10mm

Technical Specification:

Housing:	Powder coated, pressure die-cast Aluminum housing.
Front Cover:	Clear toughened glass with synthetic rubber gasket.
LED:	LM80 certified 2835 LED.
Lens:	Suitable secondary lens for better light distribution.
Gear:	Integral, Electronic, constant current driver.
Maintainance:	Top maintainable.
Internal Wiring:	Rubber/PVC insulated, Cu. Conductor.
Hardware:	SS & Ms zinc plated & passivated.
Ingress protection:	IP66
Impact resistance:	IK07
Lumen maintenance:	50,000 Hrs @ L70
Operating temperature:	-10°C to 50°C
Rated voltage & frequency:	240V, 50Hz AC

- # Energy saving
- # Long life
- # Easy installation & maintenance

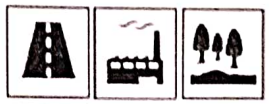
Cat. Ref.	Wattage	Current	Pf	Ithd	Efficacy	CCT	CRI
PLX SLE UL 90W IP66 L65	90±10%	≤0.43A	≥ 0.95	≤ 10%	≥ 100lm/W	5700K	≥ 70

Protections: Open ,Short circuit , reverse polarity protection and surge protection of 5KV Internal +10KV SPD

Applicable Standard: IS 10322(Pt.5/Sec.3)1987 / IEC 60598

Mounting :
Suitable for 50mm pipe bracket

Applications:
Road & Street lighting, Area lighting, Industry complex lighting applications.



DRAWN BY:	AS	V-Code	KP-2022P
CHECKED BY:	RJ	Revision	1
APPROVED BY:	AT	Valid up to: 31-03-2023	**Sheet 1 of 1**

Surya Roshni Ltd.,
Padma Tower-I,
Rajendra place,
Delhi

As improvement in design & method of manufacturing is a continuous process, the product supplied may differ in detail from data given here.

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

SURYA

TYPE TEST REPORT

Date: 23/02/2022

Product	:	90W LED Streetlight Luminaries suitable for 240V, 50Hz, 1 Ø, AC supply
Product Code	:	PLX SLE UL 90W IP66 L65
Brand Name	:	SURYA
Document references	:	IS 10322(Pt.5/Sec.3)-2012. IS 16103 (Pt.1& Pt.2):2012, IS 16104:2012, IS 16107(Pt.2/Sec. 1):2012, LM79, & TDS

Sr. No.	Requirements		Observation	Verdict
1	Visual examination	The finishing and workmanship shall be OK and acceptable	Finishing and workmanship found to be OK and acceptable Satisfactory	Pass
2	Dimensions	Shall be as per TDS	As per TDS Satisfactory	Pass
3	Marking	Clause 6 of IS:10322(Pt.1) & Clause 4 of IS:16107(pt.2/Sec.1)2012 shall apply, Shall be clear and legible	Surya Roshni Limited, Made In India, 240V_{AC}, 50Hz, 1Ø, IP 66, Cat. Ref.: PLX SLE UL 90W IP66 L65, Wattage- 90W Lamp type – LED Satisfactory	Pass
4	Construction	As per IS:10322(Pt. 2) shall apply, together with the requirements of 6.1 to 6.6	Aluminum Die cast housing(LM6), No sharp edges, IP66, Synthetic rubber gasket, Toughened Clear Glass, Top maintainable, Osram LED, optical lens for LED, Electronic driver, Class-1. Satisfactory	Pass
5	Creepage distance and Clearance	Shall be $\geq$ 3mm and $\geq$ 4mm	>3mm >4mm Satisfactory	Pass
6	Provision for Earthing	The provision given in 2.0 of IS:10322(Pt.2) shall apply	Earth contact Resistance <0.5 Ω, Leakage current < 1.0 mA Satisfactory	Pass
7	Terminals	As per IS:10322(Pt.2) shall apply	Satisfactory	Pass

AE (Ele.)

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

SURYA

Sr. No.	Requirements		Observation	Verdict
8	External and internal wiring	Clause 19 of IS:10322(Pt.2) shall apply	Satisfactory	Pass
9	Protection against Electric Shock	Clause 21 of IS:10322(Pt.2)shall apply	Test finger does not contact any live parts Satisfactory	Pass
10	Mechanical Strength	Clause 5 of IS:10322(Pt.4) shall apply	Doesn't show any damage IK07 Satisfactory	Pass
11	Endurance test and	The provision of 6 of IS:10322(Pt.4) shall apply At 25°C ambient Heat sink MCPCB Led Ts Driver Tc	No parts shall be damaged, and unserviceable, unsafe, Marking still legible and the Luminaires perform normally. Satisfactory	Pass
12	Thermal test		52°C, 68°C 73°C 72°C Satisfactory	Pass
13	Resistance to dust and Moisture Humidity test	The provision of 2 of IS:10322(Pt.4) shall apply Test for ingress of dust and Moisture (IP66) Humidity test at 95% of relative humidity shall show no damage effecting compliance with the requirement. Insulation Resistance Shall be ≥ 2MΩ on application of 500V DC Electric strength test Shall withstood a voltage of 1.5KV for 1 Min	No ingress of dust and water Satisfactory No damage observed and found in compliance with the requirement >20 MΩ Satisfactory Withstood 1.5KV without MOV Satisfactory	Pass Pass Pass Pass
14	Resistance to heat, fire & Tracking	On plastic materials only Resistance to heat Resistance to flame & Ignition	The diameter of impression <2mm The sample under test and any gas produced during the test doesn't ignite. Satisfactory	Pass Pass
15	Operating Voltage Range	The luminaries should be operable with auto adjustable 140-270V supply Voltage using the same driver	Luminaries operable within 140V - 270V supply Voltage with the same driver	Pass

AE (Elc.)

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

SURYA

Sr. No.	Requirements		Observation	Verdict
Test Voltage 240V				
16	Input Wattage	Power Consumption of the complete System, including Driver Losses 90W + 10%	90.4W	Pass
17	Input Power Factor	> 0.95	0.976	Pass
18	Max. Input Current	<434Ma	385Ma	Pass
19	THD	< 10%	6.2%	Pass
20	Electronic LED Driver efficiency	>85%	87.2%	Pass
21	Surge Protection	5KV (Internal) & 10KV SPD	Withstood 5KV & 10KV	Pass
22	Short circuit protection	Protected against output short circuiting	Protected	Pass
23	Open circuit protection	Protected against output open circuiting	Protected	Pass
24	Reverse polarity	Shall be protected against reverse polarity.	Protected	Pass
25	Electrical Protection	Phase to phase protection of 440V	Protected	Pass

Issued by

RAKESH JAISWAR
Deputy Manager Professional lighting

SURYA TECHNOLOGY & INNOVATION CENTRE
SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Test Report for LED Lamp/Luminaire

Report Number	STIC-LM79-2022-LT0116
Date	22/04/2022
Testing Agency	Surya Technology & Innovation Centre
Customer Details	
Surya Roshni Limited LBG Division Padma Tower -1 Rajendra Palace New Delhi 110008	
Product Catalogue Reference	PLX SLE UL 120W IP66
Brand	SURYA
Sample ID:	2222D13
Test Sample Description	PLX SLE UL 120W IP66, 240 V ac, 50 Hz
Equipment used	**Validity of calibration**
LMT Mirror Goniophotometer GO-DS 2000 Lab ID. STIC/PH/GO-DS /00,01,02	Calibrated by NPL Valid till 28/11/2022
YOKOGAWA Power Meter WT2010 Lab ID. STIC/PH/WT2010/03	Calibrated by Anshaankan (India) Pvt.Ltd. Valid till 27/05/2022
AC Power Supply Chroma 6430 Lab ID. STIC/PH/6430/04	Calibrated by Anshaankan (India) Pvt.Ltd. Valid till 25/05/2022
Test procedure applicable	MS-2L-015
Test Details:	**Document References/Standard:**
• Light Intensity Distribution • Luminous Flux Measurement • Electrical Parameters Measurement	LM-79-08 / IS 16106:2012

Disclaimer:
This report shall not be reproduced, except in full.
The results of test in this report apply only to sample item/ product tested.
No sampling was conducted by this laboratory for the test item/product mentioned overleaf.

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		**Approved By**
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Ele.)

SURYA TECHNOLOGY & INNOVATION CENTRE
SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Electrical & Photometric Test Report	
Sample ID	2222D13
Report Number	STIC-LM79-2022-LT0116
Catalogue Reference	PLX SLE UL 120W IP66
Date of Testing	22/04/2022
Receipt Date	22/04/2022
Condition of sample	Good
Orientation of Lamp/Luminaire	Downward, no tilt
Photometric Distance	19.083 m
Test Conditions:	
Standard applicable	LM-79-08
Ambient Temperature	24.3° C
Relative Humidity	51 %
Test voltage	240.0 V ac
Frequency	50 Hz
Stabilization Time	60 min
Total operating time	90 min
Measured Electrical Parameters:	
Supply Voltage	240.13 V
Input Current	0.504 A
Total Power	119.76 W
Power Factor	0.989
Photometric Measurement Data:	
Total Measured Lumen	12196.35 lm
Efficacy	101.84 lm/W
Beam Angle Measured	NA
Spread	NA
Throw	NA
Intensity cd (Maximum)	NA
Light Intensity Distribution Diagram	Attached (Refer to page no. 3)
Zonal Flux Diagram(street)	Attached (Refer to page no. 4)
Spectrum report	Attached (Refer to page no. 5)

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		**Approved By**
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

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SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
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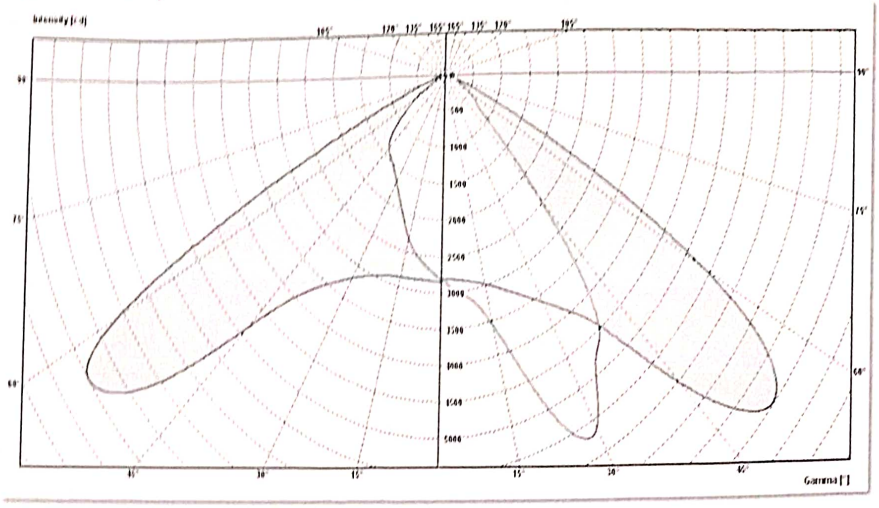
Light Intensity Distribution Diagram-



Catalogue Reference	PLX SLE UL 120W IP66	Sample ID	2222D13

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		Approved By
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Ele.)

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Lighting Division
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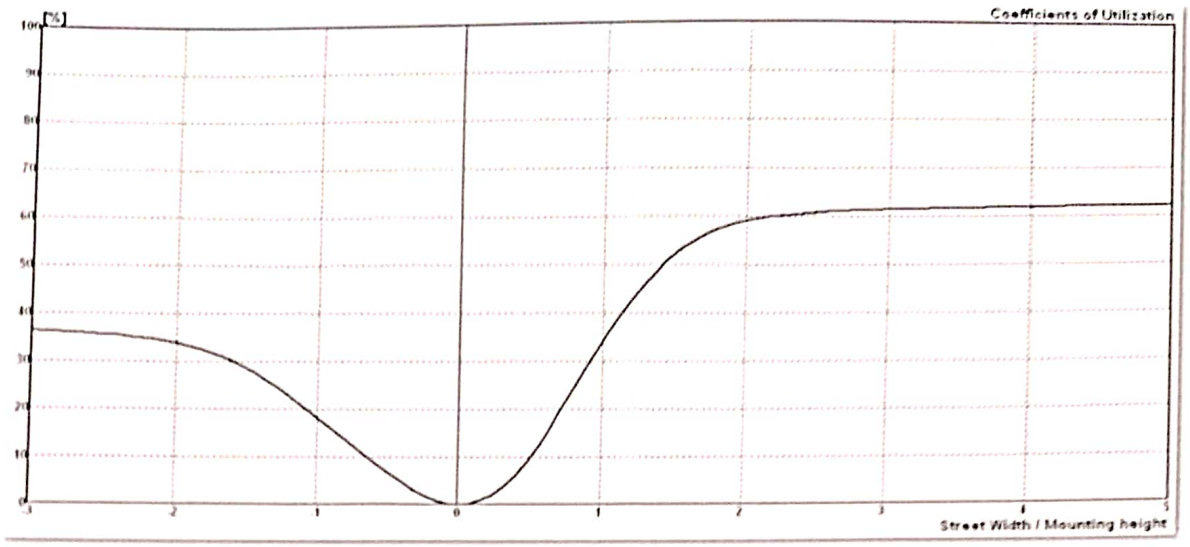
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Zonal Flux Diagram (Street) –



Catalogue Reference	PLX SLE UL 120W IP66	**Sample ID**	2222D13

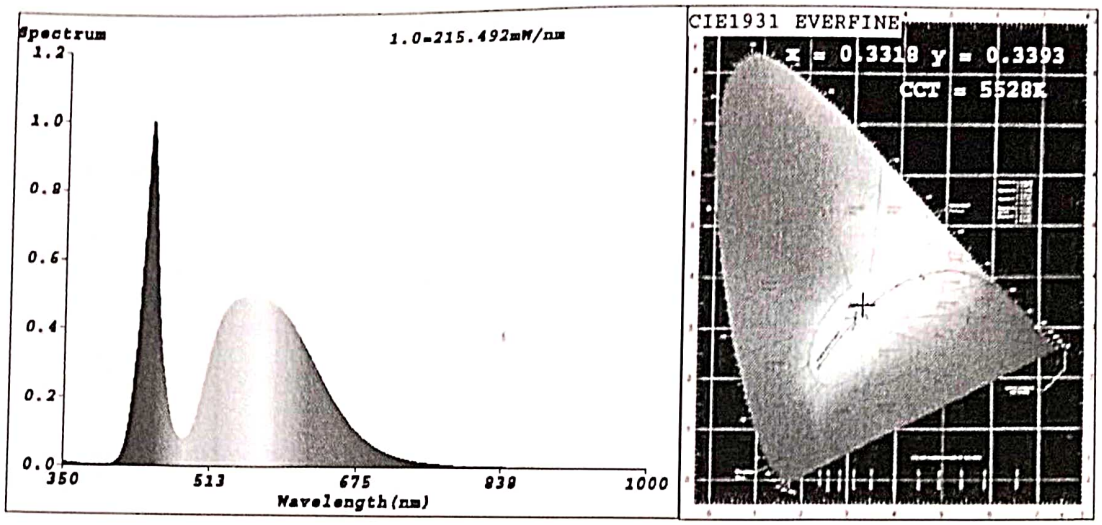
SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		**Approved By**
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Ele.)

SURYA TECHNOLOGY & INNOVATION CENTRE
SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Spectrum Report –



Color Parameters:

Chromaticity Coordinate:x=0.3318 y=0.3393/u'=0.2072 v'=0.4765

CCT=5528K(Duv=-0.0007) Dominant WL:Ld =539.3nm Purity=1.4%

Ratio:R=13.9% G=83.0% B=3.1%||Peak WL:Lp=445.8nm FWHM=20.2nm

Render Index:Ra=72.6

R1 =73	*R2 =75*	*R3 =75*	*R4 =75*	*R5 =74*	*R6 =67*	*R7 =78*	
R8 =64	*R9 =0*	*R10=40*	*R11=75*	*R12=46*	*R13=72*	*R14=86*	*R15=69*

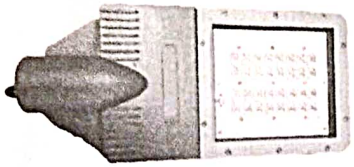
Summary of Test Results

Test Parameter	Standard	Sample ID	Result
Electrical & Photometry	LM-79-08	2222D13	Pass

----------End of Test Report----------

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		Approved By
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Elc.)



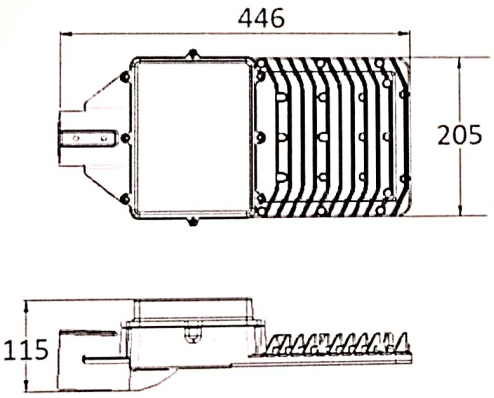
Pollux - 120

A LED Streetlight luminaire for Road & Street lighting applications.

New era of street lighting with energy saving and long life

SURYA

PLX SLE UL 120W IP66 | Technical Specification: | Class-1



Tolerance ± 10mm

Housing:	Powder coated, pressure die-cast Aluminum housing.
Front Cover:	Clear toughened glass with synthetic rubber gasket.
LED:	LM80 certified high power LED.
Lens:	Suitable secondary lens for better light distribution.
Gear:	Integral, Electronic, Constant Current driver.
Maintainance:	Top maintainable.
Internal Wiring:	PVC/Rubber insulated, Cu. Conductor.
Hardware:	SS & Ms zinc plated & passivated.
Ingress protection:	IP66
Impact resistance:	IK07
Lumen maintenance:	50,000 Hrs @ L70
Operating temperature:	-10°C to 50°C
Rated voltage & frequency:	240V, 50Hz AC

 # Energy saving
 # Long life
 # Easy installation & maintenance

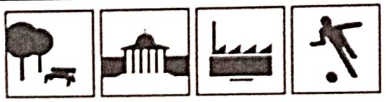
Cat. Ref.	Wattage	Current	Pf	Ithd	Efficacy	CCT	CRI
PLX SLE UL 120W IP66	120±10%	≤0.57A	≥ 0.95	≤ 10%	≥ 100lm/W	5700K	≥ 70

Protections: Open & Short circuit protection, reverse polarity protection and surge protection 5KV & 10KV External SPD

Applicable Standard: IS 10322(Pt.5/Sec.3)1987 / IEC 60598

Mounting :
Suitable for 50mm pipe bracket

Applications:
Road & Street lighting, Area lighting, Industry complex lighting applications.



DRAWN BY:	AS	V-Code	KP-2018P
CHECKED BY:	RJ	Revision	0
APPROVED BY:	AT	Valid up to: 31-03-2023	**Sheet 1 of 1**

Surya Roshni Ltd.,
Padma Tower-I,
Rajendra place, Delhi

As improvement in design & method of manufacturing is a continuous process, the product supplied may differ in detail from data given here.

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

SURYA

Date: 22/03/2022

TYPE TEST REPORT

Product	:	120W LED Streetlight Luminaires suitable for 240V, 50Hz, 1 Ø, AC supply.
Product Code	:	PLX SLE UL 120W IP66
Brand Name	:	SURYA
Document references	:	IS 10322(Pt.5/Sec.3)-2012. IS 16103 (Pt.1& Pt.2):2012, IS 16104:2012, IS 16107(Pt.2/Sec. 1):2012, LM79, & TDS

Sr. No.	Requirements		Observation	Verdict
1	Visual examination	The finishing and workmanship shall be OK and acceptable	Finishing and workmanship found to be OK and acceptable Satisfactory	Pass
2	Dimensions	Shall be as per TDS	As per TDS Satisfactory	Pass
3	Marking	Clause 6 of IS:10322(Pt.1) & Clause 4 of IS:16107(pt.2/Sec.1)2012 shall apply, Shall be clear and legible	Surya Roshni Limited, Made In India, 240V, 50Hz a.c., 1Ø,IP 66, Cat. Ref. PLX SLE UL 120W IP66, Wattage-120W Lamp type – LED	Pass
4	Construction	As per IS:10322(Pt. 2) shall apply, together with the requirements of 6.1 to 6.6	Aluminum Die cast housing LM6, No sharp edges, IP66, Silicon Gasket, Top maintainable, Toughened Clear Glass, optical lens for LED, Osram Duris S8 leds, and Electronic Constant Current driver.	Pass
5	Provision for Earthing	The provision given in 2.0 of IS:10322(Pt. 2) shall apply	Earth contact Resistance <0.5 Ω, Leakage current < 1.0 mA Satisfactory	Pass
6	Creepage distance and Clearance	Shall be ≥ 3mm and ≥ 4mm	3.5mm & 4.5mm	Pass
7	Terminals	As per IS:10322(Pt.2) shall apply	As per standard specification	Pass
8	External and internal wiring	Clause 19 of IS:10322(Pt. 2) shall apply	As per standard specification	Pass

AE (Ele.)

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

SURYA

Sr. No.	Requirements		Observation	Verdict
9	Protection against Electric Shock	The provision given in 21 of IS:10322(Pt. 2) shall apply	Test finger does not contact any live parts Satisfactory	Pass
10	Mechanical Strength	Clause 5 of IS:10322(Pt.4) shall apply	Doesn't show any damage IK07	Pass
11	Endurance test and	Clause 6 of IS:10322(Pt.4) shall apply	No parts shall be damaged, unserviceable, and unsafe & marking is legible and the Luminaires perform normally.	Pass
12	Thermal test	At 25°C ambient Heat sink MCPCB Led Ts Driver Tc	52°C, 63°C 66°C 70°C Satisfactory	Pass
13	Resistance to heat, fire & Tracking	On plastic materials only	The diameter of impression <1.20mm The sample under test and any gas produced during the test doesn't ignite.	Pass Pass
14	Resistance to dust and Moisture Humidity test	The provision of 2 of IS:10322(Pt. 4) shall apply Test for ingress of dust and Moisture (IP66) Humidity test at 95% of relative humidity shall show no damage effecting compliance with the requirement. Insulation Resistance Shall be ≥ 2MΩ on application of 500V DC Electric strength test Shall withstood a voltage of 1.5KV for 1 Min	No ingress of dust and water Satisfactory No damage observed and found in compliance with the requirement >2 MΩ Satisfactory Withstood 1.5KV without MOV Satisfactory	Pass Pass Pass Pass
15	Operating Voltage Range	The luminaries shall operate within 140-270V supply Voltage with the same driver	Luminaries operable within 140V -270V supply Voltage with the same driver	Pass

AE (Elec.)

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

SURYA

Sr. No.	Requirements		Observation	Verdict
Test Voltage 240V				
16	Input Wattage	Power Consumption of the complete System, including Driver Losses 120W ±10%	120.8W	Pass
17	Input Power Factor	> 0.95	0.988	Pass
18	Max. Input Current	< 578Ma	509Ma	Pass
19	THD	< 10%	5.1%	Pass
20	Electronic LED Driver efficiency	>87%	88.7%	Pass
21	Surge Protection	5KV (in-built) 10KV External	Withstood 5KV Withstood 10KV	Pass
22	Over voltage protection	Shall be protected for over voltages	Protected	Pass
23	Short circuit protection	Protected against output short circuiting	Protected	Pass
24	Open circuit protection	Protected against output open circuiting	Protected	Pass
25	Reverse Polarity	Reverse polarity protected	Protected	Pass
26	Low Voltage & High Voltage Cut OFF	Low Voltage cut off below 120V & High Voltage cut off @300V	Provided	Pass

Issued by

RAKESH JAISWAR
Deputy Manager PL

SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Test Report for LED Lamp/Luminaire

Report Number	STIC-LM79-2022-LT0119
Date	26/04/2022
Testing Agency	Surya Technology & Innovation Centre
Customer Details	
Surya Roshni Limited LBG Division Padma Tower -1 Rajendra Palace New Delhi 110008	
Product Catalogue Reference	LEON SLE FL 200W IP66
Brand	SURYA
Sample ID:	2226D09
Test Sample Description	LEON SLE FL 200W IP66, 240 V ac, 50 Hz
Equipment used	**Validity of calibration**
LMT Mirror Goniophotometer GO-DS 2000 Lab ID. STIC/PH/GO-DS /00,01,02	Calibrated by NPL Valid till 28/11/2022
YOKOGAWA Power Meter WT2010 Lab ID. STIC/PH/WT2010/03	Calibrated by Anshaankan (India) Pvt.Ltd. Valid till 27/05/2022
AC Power Supply Chroma 6430 Lab ID. STIC/PH/6430/04	Calibrated by Anshaankan (India) Pvt.Ltd. Valid till 25/05/2022
Reference Standard light Source D204 E27 Omnidirectinal TH Lamp ID.306/OPT/2017	Calibrated by NPL Valid till 18/01/2023
Test procedure applicable	MS-2L-015
Test Details:	**Document References/Standard:**
• Light Intensity Distribution • Luminous Flux Measurement • Electrical Parameters Measurement	LM-79-08 / IS 16106:2012

Disclaimer:
This report shall not be reproduced, except in full.
The results of test in this report apply only to sample item/ product tested.
No sampling was conducted by this laboratory for the test item/product mentioned overleaf.

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		Approved By
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

AE (Elc.)

SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
Email: surya@sroshni.com
Web: http://www.surya.co.in

SURYA

Electrical & Photometric Test Report	
Sample ID	2226D09
Report Number	STIC-LM79-2022-LT0119
Catalogue Reference	LEON SLE FL 200W IP66
Date of Testing	26/04/2022
Receipt Date	26/04/2022
Condition of sample	Good
Orientation of Lamp/Luminaire	Downward, no tilt
Photometric Distance	31.288 m
Test Conditions:	
Standard applicable	LM-79-08
Ambient Temperature	24.3° C
Relative Humidity	49 %
Test voltage	240.0 V ac
Frequency	50 Hz
Stabilization Time	60 min
Total operating time	90 min
Measured Electrical Parameters:	
Supply Voltage	240.04 V
Input Current	0.845 A
Total Power	200.21 W
Power Factor	0.987
Photometric Measurement Data:	
Total Measured Lumen	20277.26 lm
Efficacy	101.28 lm/W
Beam Angle Measured	NA
Spread	NA
Throw	NA
Intensity cd (Maximum)	NA
Light Intensity Distribution Diagram	Attached (Refer to page no. 3)
Spectrum Scan	Attached (Refer to page no. 4)

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		**Approved By**
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

SURYA

SURYA ROSHNI LTD.
Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
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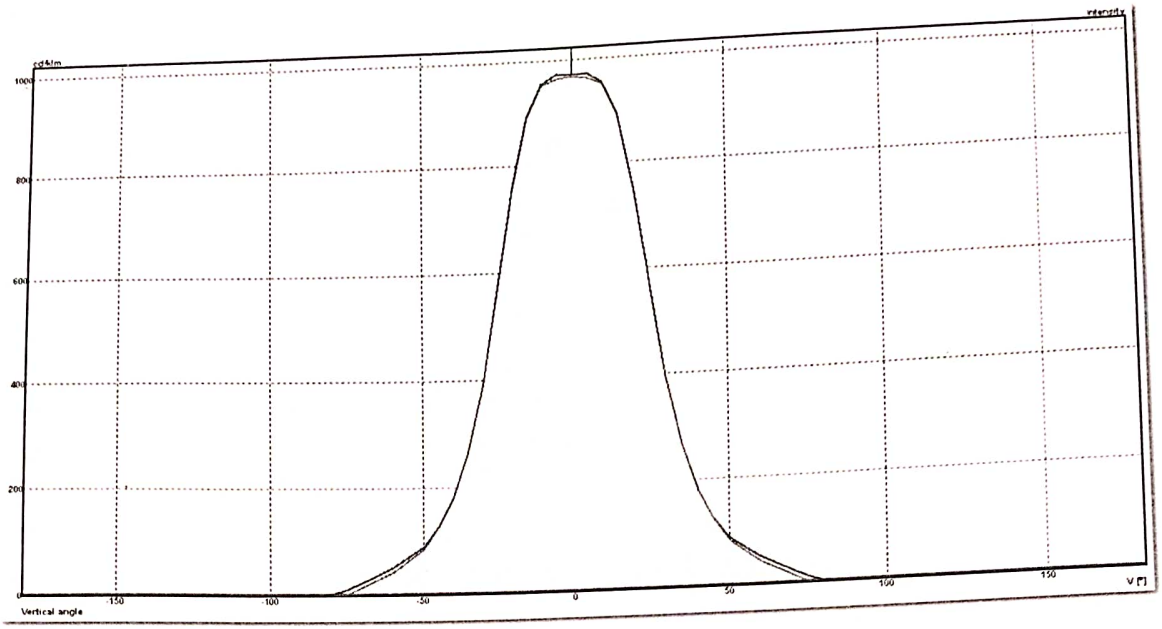
Light Intensity Distribution Diagram-



Catalogue Reference	LEON SLE FL 200W IP66	**Sample ID**	2226D09

SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		**Approved By**
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

Sr. (Elec.)

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Lighting Division
D-63, Hosiery Complex Phase-II
Noida (U.P.), 201305
Contact: +91 (120) 4825400
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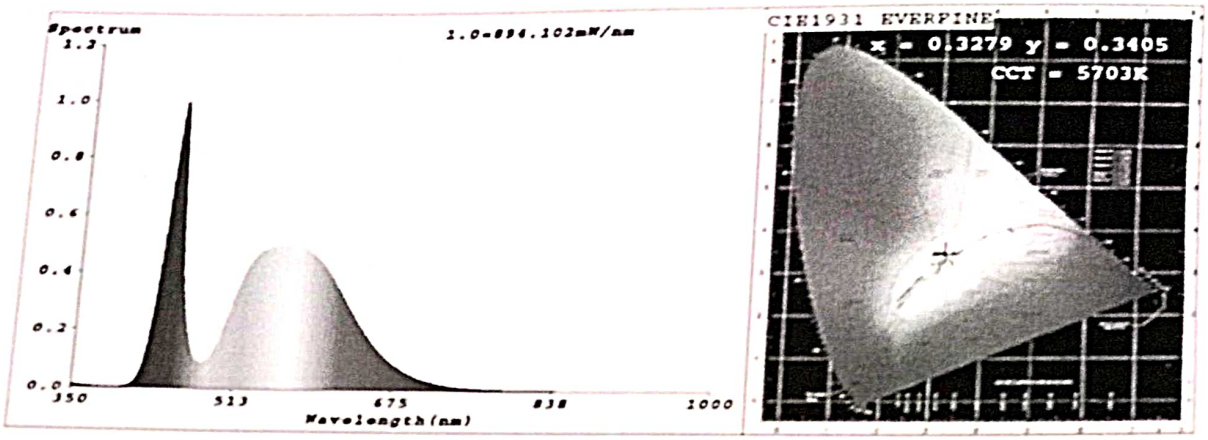
SURYA

Spectrum Scan



Color Parameters:

Chromaticity Coordinate:x=0.3279 y=0.3405/u'=0.2040 v'=0.4766

CCT=5703K(Duv=0.0018) Dominant WL:Ld =510.4nm Purity=1.7%

Ratio:R=13.3% G=83.5% B=3.2%||Peak WL:Lp=445.3nm FWHX=20.9nm

Render Index:Ra=71.8

R1 =71	R2 =74	R3 =77	R4 =74	R5 =73	R6 =67	R7 =78	
R8 =60	R9 =0	R10=39	R11=74	R12=47	R13=70	R14=87	R15=65

Summary of Test Results

Test Parameter	Standard	Sample ID	Result
Electrical & Photometry	LM-79-08	2226D09	Pass

----------End of Test Report----------

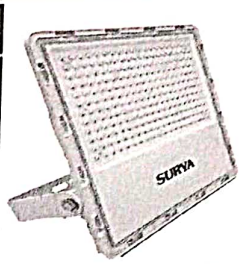
SURYA TECHNOLOGY & INNOVATION CENTRE			
	Prepared By		Approved By
Signature			
Designation	Engineer (R&D)		Sr. Manager (R&D)

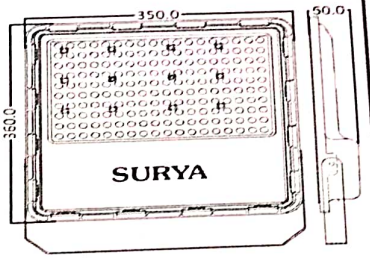
SURYA

Energising Lifestyles

CATALOGUE — **LEON-SLE FL 200W IP66**

LED Flood Light





Tolerance ± 10mm

Application

Flood Light luminaire with dedicated lenses to achieve precise lighting. Suitable for Area lighting, security lighting, bill board, Industry area and other general applications.

Technical Specifications

System Wattage	200W
Lamp Type	LM80 certified, discrete LEDs
Optic	Suitable lens cluster for optimum light distribution
Lumen output	≥ 20000 lm
System Lumen efficacy	≥ 100 lm/W
Colour temperature	5700K
CRI	>70
THD	< 10%
PF	> 0.95
Surge Protection	≥ 5 KV
Rated Voltage & frequency	240V, 50Hz.
Housing	Aluminium Pressure Die Cast Housing
Optical cover	Polycarbonate IP lens with silicon gasket
Ingress Protection	IP66
Impact Resistance	IK07

As per - IS:10322(Pt.5/Sec.5)-1987 / IEC 60598

V-Code	BI-2020P
Revision	01
Valid up to: 31.12.2022	Sheet 1 of 1

- **Maintenance Free.**
- **Easy to Install.**
- **Life Class 50000 Burning Hours with 70% Lumen maintenance**

Due to continuous development in product, given data is subject to variation without any prior intimation.
Surya Roshni Limited, Padma Tower – 1, Rajendra Palace, New Delhi – 110008. Website: www.surya.co.in

AE (Elec.)

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

SURYA

Date: 26/03/2022

TYPE TEST REPORT

Product	:	200W LED flood light Luminaires suitable for 240V, 50Hz, 1 Ø, AC supply.
Product Code	:	LEON SLE FL 200W IP66
Brand Name	:	SURYA
Document references	:	IS 10322(Pt.5/Sec.5)-2013. IS 16103 (Pt.1& Pt.2):2012, IS 16104:2012, IS 16107(Pt.2/Sec. 1):2012, LM79, & TDS

Sr. No.	Requirements		Observation	Verdict
1	Visual examination	The finishing and workmanship shall be OK and acceptable	Finishing and workmanship found to be OK and acceptable Satisfactory	Pass
2	Dimensions	Shall be as per TDS	As per TDS Satisfactory	Pass
3	Marking	Clause 6 of IS:10322(Pt.1) & Clause 4 of IS:16107(pt.2/Sec.1)2012 shall apply, Shall be clear and legible	Surya Roshni Limited, Made In India, 240V, 50Hz a.c., 1Ø, IP 66, Cat. Ref. LEON SLE FL 200W IP66, Wattage-200W Lamp type – LED	Pass
4	Construction	As per IS:10322(Pt. 2) shall apply, together with the requirements of 6.1 to 6.6	Aluminum Die cast housing LM6 of no sharp edges, IP66, Synthetic Gasket, Polycarbonate IP lens for LED, Electronic Constant Current driver & Class I Luminaire with Cradle mounting.	Pass
		Screws & connections	Withstood an applied torque of 8Nm for five times. Corrosion resistant	Pass
5	Provision for Earthing	The provision given in 2.0 of part 2 of IS 10322 shall apply	Earth contact Resistance <0.5 Ω, Leakage current < 1.0 mA	Pass
6	Creepage distance and Clearance	Shall be ≥ 3mm and ≥ 4mm	>3mm & >4mm	Pass

AE (Ele.)

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

SURYA

Sr. No.	Requirements		Observation	Verdict
7	Terminals	As per IS:10322(Pt.2) shall apply	As per standard specification	Pass
8	External and internal wiring	Clause 19 of IS:10322(Pt. 2) shall apply	As per standard specification	Pass
9	Protection against Electric Shock	Clause 21 of IS:10322(Pt.2)shall apply	No contact with live parts	Pass Pass
10	Mechanical Strength	Clause 5 of IS:10322(Pt.4) shall apply	Doesn't show any damage IK07	Pass
11	Endurance test and	Clause 6 of IS:10322(Pt.4) shall apply	No parts shall be damaged, unserviceable, and unsafe & marking is legible and the Luminaires perform normally.	Pass
12	Thermal test	At 25°C ambient Heat sink MCPCB Led Ts Driver Tc	53°C, 67°C, 61°C 72°C	Pass
13	Resistance to heat, fire & Tracking	On plastic materials only	The diameter of impression <1.20mm The sample under test and any gas produced during the test doesn't ignite.	Pass Pass
14	Resistance to dust and Moisture Humidity test	The provision of 2 of part 4 of IS 10322 shall apply Test for ingress of dust and Moisture (IP66) Humidity test at 95% of relative humidity shall show no damage effecting compliance with the requirement. Insulation Resistance Shall be ≥ 2MΩ on application of 500V DC Electric strength test Shall withstood a voltage of 1.5KV for 1 Min	No ingress of dust and water Satisfactory No damage observed and found in compliance with the requirement >2 MΩ Satisfactory Withstood 1.5KV without MOV Satisfactory	Pass Pass Pass Pass
15	Operating Voltage Range	The luminaries shall operate within 140-270V supply Voltage with the same driver	Luminaries operable within 140V - 270V supply Voltage with the same driver	Pass

AE (Elc.)

SURYA ROSHNI LTD.
(Lighting Division)
Padma Tower – I,
Rajendra Place, New Delhi – 110008.

SURYA

Sr. No.	Requirements		Observation	Verdict
Test Voltage 240V				
16	Input Wattage	Power Consumption of the complete System, including Driver Losses 200W ±5%	200.7W	Pass
17	Input Power Factor	> 0.95	0.971	Pass
18	Max. Input Current	< 0.96A	0.861A	Pass
19	THD	< 10%	07.3%	Pass
20	Electronic LED Driver efficiency	>85%	88.8%	Pass
21	Surge Protection	5KV (in-built) 10KV External	Withstood 5KV Withstood 10KV	Pass
22	Over voltage protection	Shall be protected for over voltages	Protected	Pass
23	Short circuit protection	Protected against output short circuiting	Protected	Pass
24	Open circuit protection	Protected against output open circuiting	Protected	Pass
25	Reverse Polarity	Reverse polarity protected	Protected	Pass
26	Low Voltage & High Voltage Cut OFF	Low Voltage cut off below 100V & High Voltage cut off @300V	Provided	Pass

Issued by

RAKESH JAISWAR
Deputy Manager PL

AE (Elec.)